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CAUSE AND EFFECT IN HUMAN GEOGRAPHY

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FOR some years past it has been assumed that geographical determinism is a discredited mode of thinking.¹ If a geographer believed in such a heresy he was careful to maintain his respectability by hiding the fact. The majority, who could not in good faith dismiss it in its entirety, took refuge in "possibilism."² At first glance possibilism seemed to give that scope for freedom in man's actions which had been denied in a strict environmentalism; but although it spoke in terms of collaboration between man and nature, and even stressed that man exercised a choice and thereby brought in freedom of will, it was clear that the choice was one within limits, and that those limits were set by nature. Although man was not "fatally determined" he was, it seems, "circumscribed," and his freedom was more apparent than real. The famous words, "There are not necessities, but everywhere possibilities," lose something of their all-embracing freedom when we remember that to Febvre different regions offered possibilities differing sufficiently in number and quality to warrant a hierarchy.³ The possibilities are in fact limited. Man chooses, but only from the range with which nature presents him. This, after all, is not very dissimilar from the modified determinism of Griffith Taylor.⁴ In the latter there is, it is true, a Master Plan, and on it a path which is indicated by nature and which man would do well to learn. But even if, as possibilists suggest, there are several paths—i.e., several possibilities—from which man can choose one, does not this also suggest a plan? Indeed, on closer examination, possibilism proves to be more a variant of determinism than of libertarianism: but so innocuous a variant did it seem that geographers on the whole were content, happy in the thought that determinism as a doctrine belonged to the past.

And then the skeleton in the cupboard stirred! A hint was given here and there that it was time geographers found a "new determinism"—all that was needed to restore the physical environment to its proper determining role in the scheme of things was a redefinition of the old categories. Professor Spate, for example, ad-

¹ R. E. Dickinson, *The West European City* (London, 1951), p. 6.

² G. Tatham, "Environmentalism and Possibilism," in *Geography in the Twentieth Century* (ed., G. Taylor; New York, 1953).

³ L. Febvre, *Geographical Introduction to History* (London, 1932), p. 182.

⁴ G. Taylor, "Introduction," *Geography in the Twentieth Century* (New York, 1953), p. 12.

vanced—or retreated—from possibilism to “probabilism.” This was a logical step which merely stated that if nature offered several possibilities it was likely that one would have natural advantages over the others which would make it *probable* that man would choose this course. Then Spate abandoned his defenses and confessed to being a “neo-determinist.”⁵ These stages showed differences of degree only.

But whereas in the past students have been weighing the arguments for and against determinism in terms of examples—and sheer numbers in works such as Miss Semple’s are impressive—efforts have been made more recently to shift the bases of the underlying arguments. In a paper read before the Institute of British Geographers in 1951⁶ Mr. A. F. Martin laid the foundations of the philosophical arguments behind the claims of the determinists. Environmentalism was brought within the framework of logic by defining it in terms of cause and effect.

Mr. Martin recognized two distinct stages in the problem, the first being purely philosophical and concerned with the ultimate nature of reality and the truth of what governs all actions: the second he called the “working belief of the geographer”; that is, the hypothesis which best suits his descriptive and analytical purposes. There are few geographers who are also trained philosophers, and there is more likely to be discussion on the second stage than there is on the first.⁷ But there are two points in the paper concerning this “working belief” which reopen the whole problem of determinism in human geography and in the methodology of the subject, and which must therefore be aired.

(a) The first point is the need felt in Martin’s paper for an uncompromisingly scientific human geography: by this is meant that laws must be formulated which could be applied in human geography with the same exclusiveness and rigor as scientific laws are applied in the physical world. Such an assertion demands that the position of human geography in relation to the methodology of the physical and the social sciences must be re-examined.

(b) The paper also suggests that the desired scientific human geography must rest on the unqualified acceptance of cause and effect as a basic fundamental category. Possibilism must be discarded entirely because there could be no compromise between causation and complete freedom of will. The entire dilemma of free will could of course be averted by this acceptance of the validity of environmental deter-

⁵ O. H. K. Spate, “Toynbee and Huntington, A Study in Determinism,” *Geographical Journal*, Vol. CXVIII, No. 4 (1952). O. H. K. Spate, *The Compass of Geography* (Canberra, 1953), pp. 14–15: “There are signs at least of a neodeterminism, more subtle than the old, less inclined to think of environment as exercising an almost dictatorial power over human societies, but convinced that it is far more influential than the current view admits: and with this trend I would identify myself.”

⁶ A. F. Martin, “The Necessity for Determinism,” *Institute of British Geographers Transactions*, Vol. XVII (1951), pp. 1–11.

⁷ Fortunately Mr. Martin makes our retreat from the philosophical field an honorable one, for he states that although the answer to the philosophical question should provide the working belief, if we are unable to answer the first it does not debar us from attempting the second. I am taking him at his word. Some of the philosophical implications are discussed in A. C. Montefiore and W. M. Williams, “Determinism and Possibilism,” *Geographical Studies*, Vol. II, No. 1, 1955.

minism based on cause and effect. The paper approaches this problem largely from the philosophical viewpoint, and its author has to admit to its inadequacy in two respects, namely (i) that so very often it does seem that man chooses and exercises freedom of will, a fact that cannot be explained due to the inadequacy of our knowledge of how mind and matter interact; and (ii) by exceptions, which again may show incomplete knowledge or the incorrect formulation of generalizations. In spite of this, geography, it is stated, must follow the physical sciences in accepting causation as a working hypothesis.⁸ Unless this is done, the "formulation of any laws, the explanation of any phenomena is impossible."

The salient points in this new basis for a human geography seem to be centered on "laws" and "cause and effect," and if so it seems a basis on which determinism is inescapable. For this reason it is necessary to examine further what is implied in these two fundamental concepts; whether they are as obvious and clear-cut as they seem to be; and whether or not it is desirable to frame a human geography in these terms, and consequently to submit it to a determinism from which it was beginning to free itself.

LAWS IN THE PHYSICAL AND SOCIAL SCIENCES

Striving for "laws which are similar in stringency to those of physical science"⁹ is a radical approach which leaves one with the uncomfortable feeling that human geographers are being asked to do the impossible. For it immediately brings to mind some universal postulate, like the law of gravity. A postulate similar to this would, of course, have to be reframed and restated as soon as exceptions to it were found. In geography exceptions to almost any generalization are unfortunately all too frequent; indeed they are meat and drink to many—while they exist they can be lumped together into a convenient residual class called "due to other factors" which can suit almost any explanation. But so long as we recognize exceptions and adhere to them we are very unlikely to attain universal postulates—if indeed those are at all possible.

What is the nature of the stringency of the scientific laws we are asked to emulate? Surely the scientific basis has been simplified, and if we want to borrow categories from science we should inquire a little further into the complexities of what we are borrowing. Not all scientific laws are universal postulates. Kaufmann puts into a category of their own what he calls "theoretical laws," or rules of procedure—laws which admit of exceptions because they deal with the actual physical world, and not with the idealized cosmos in which universal postulates are of necessity without exception.¹⁰ The latter are what some scientists call "laws of nature," applicable at all times and at all places,¹¹ within the limitation that at best man can

⁸ This in spite of the fact that cause and effect may not be justified metaphysically. See Martin, *op. cit.*, p. 2: "Philosophically we may never be sure of cause and effect; the nearest we may come is to note and search for concomitance or the invariable sequence of events. Concomitance is not equivalent to causation, but may be accepted as evidence of it."

⁹ Martin, *op. cit.*, p. 9, note A.

¹⁰ F. Kaufmann, *Methodology of the Social Sciences* (Oxford, 1944), p. 87.

¹¹ S. Toulmin, *The Philosophy of Science* (London, 1953), p. 145.

suggest only provisional hypotheses to explain the universe. Theoretical laws, however, do allow science to go forward step by step, explaining certain correlations without of necessity explaining reality.

In modern physics the state of affairs is extremely complex, and Kaufmann would go so far as to suggest that there are now two classes of laws:¹²

(a) The laws of classical physics, which are based on the acceptance of cause and effect and seem adequate for the observation of macroscopic phenomena. Those are "molar laws," but the phenomena of microscopic order do not seem to conform to these laws.

(b) Their movements may be described by "quantum laws." The endeavor to find a link between these two types of laws has resulted in a "correspondence principle" which suggests that microscopic behavior approaches the expected behavior of molar laws when the numbers are such that they can be treated statistically.¹³

This brings us to the crux of the difficulty of assuming for human geography stringent laws of the kind with which we are familiar in classical physics. If physicists are finding difficulty in providing a frame of reference which deals with observable behavior in the microcosm, it is hardly the time for geographers to claim that they can only justify a subject like human geography by fitting it into categories which may be entirely inadequate.

The laws of social sciences, on the other hand, may be thought of in two ways:

(a) That they are different in degree only from those of the physical sciences—i.e., from the classical laws. This is Martin's view, for example, and indeed the view of any determinist. The difference in degree is assumed from Martin's paper because he denies the difference in kind, yet stresses the fact that human geographical laws should be akin to the laws of science rather than those of sociology.¹⁴ This may stem partly from the assumption that there is a causal chain which begins with the physical world, and which must, therefore, reflect its laws. If one accepted this viewpoint, the earlier determinist views can be said to have erred only in their crudity. Too little was known to formulate laws accurate enough to cover all observable phenomena. But one would hesitate to accept the proposition that the method of making the earlier determinism less crude—i.e., of making the laws more stringent—is to be found, as Martin suggests, in subdividing the categories of the physical environment. If this belief is accepted it follows that, with greater knowledge, the relationships which geographers study will become clear enough for laws of the universal type to be formulated and applied. (As far as the geographer is concerned, such laws would often be very closely coupled with the environment, but whether they would have their origin invariably in the physical environment is a very debatable point).

¹² Kaufmann, *op. cit.*

¹³ F. Schroedinger: "If we can speak of a lawfulness or regularity in such a connection, then lawfulness is merely statistical. It prevails only in the macroscopic realm of the mass." *London Observer* 13.4.1930. Quoted in C. E. M. Joad, *Guide to Modern Thought* (London, 1942), p. 78.

¹⁴ Martin, *op. cit.*, pp. 9, 10, note A.

(b) The laws of social sciences may also be thought of as different in kind from those of the physical sciences. This centers around the belief in free will. According to the belief in an incalculably free-will¹⁵ laws can never be found of stringency comparable to those in physical sciences, because the nature of the human mind is such that human actions are not pre-determined. The course of human activity cannot, therefore, be accurately predicted. Yet social scientists are prepared to talk in terms of generalizations, of working hypotheses; sociology is prepared to introduce experiments into its work and even engage in prediction. One does not expect stringency in such laws; but—if we may make a parallel with the physical sciences and their recognition of the possibility of two kinds of laws—would we not be justified in placing the phenomena of the social sciences, including those of human geography, in the category of the microcosmic or quantum laws? Something similar to a "correspondence principle" would be the link between the incalculable jumps and behavior of small groups, and the generalizations based on the behavior of very large groups. The lack of stringency lies in the finite numbers dealt with in the social sciences as opposed to the infinite numbers dealt with in the physical sciences. At this latter extreme statistical regularity is such that it suggests extreme stringency or absolute validity; while at the other end statistical variations and exceptions are much higher, and deviations in themselves warrant study. What appears as indeterminacy in the microcosm achieves the regularity of the invariable in the macrocosm.¹⁶ At best the geographer is dealing with a large microcosm whenever human behavior has to be taken into consideration. If the actions of a large number of human beings follow a pattern, however variable the human motivation, then generalizations or broad principles can be drawn up. But however broad the generalization, it might fail in strict application to any single phenomenon. Any pattern which emerges does so as the statistical mean of the behavior of a mass of human individuals, and any generalization which the human geographer might find useful must be based on this behavior.¹⁷

The issue is often confused when the regularity of certain sequences which could be stated as a generalization is related to determinism. This is not necessarily implied in any law;¹⁸ and it can lead to two misconceptions. The first is that it is absolutely necessary to answer the question "why" in any given relationship, leading to the search for ultimate causes. On the whole the question "why" hardly ever arises in science. It is pushed back into the realm of metaphysics, al-

¹⁵ This is the extreme interpretation of the term "free will." See Kaufmann, *op. cit.*, pp. 170-172.

¹⁶ Schroedinger, *op. cit.*

¹⁷ P. R. Crowe, "On Progress in Geography," *Scottish Geographical Magazine*, Vol. LIV (1938), p. 16. "New principles will have to take the form of statements or tendencies similar to those of the social sciences."

¹⁸ T. D. Weldon, *The Vocabulary of Politics* (London, 1953), p. 66. "But we fall into a mistake as soon as we argue from [statistical regularity] that [human behavior] is in some sense determined. This is a mixture of 'law' meaning 'command' and 'law' meaning 'logical or deductive necessitation.' To act for a reason is not at all the same as to be constrained."

most beyond the interest of most scientists. The most pressing question in science is "how." Relationships can be explained on this basis without taking the problem further than its immediate context. Within a known context a physical law states a relationship which implies cause, but the context is always limited. "Why" can be left to the philosophers; for the scientist it is enough to ask "how."

The second is a more glaring misconception. It is the assumption that a law carries within itself a compulsion. Actions are deemed to be determined by law in the sense that there is no alternative. This is implied in many passages from the earlier determinists and is summed up in Ratzel's famous words, "A people should live on the land fate has given them; they should die there, submitting to the law." Even today the same implication is often made, showing a confusion of thought between two kinds of laws; the one is a command behind which is an authority, and which carries with it its own punishment for a transgression of the law; the other is a generalization, a provisional hypothesis to account for observed phenomena. When the laws of science were "laws of nature" in the old sense, their identification with the will of a supra-natural authority was not surprising, nor was the notion of "breaking the law"—in the sense of transgressing a supreme will—which carried its own punishment. But so long as scientific laws are inventions, the result of man's effort to define order in the cosmos, compulsion can never be implied. In social science, for example, the majority of people do not act in a certain way because they are impelled to do so by sociological laws—these laws are merely convenient ways of stating the way in which the majority of the people act. A political poll of the percentage of people in favor of certain parties will not in any way affect the results at a subsequent election; the poll has merely predicted, on a sample basis, the probable way in which people would vote if there were an election. In the same way a spring-line at the base of a scarp does not determine the distribution of population and the pattern of settlement in the sense that people are forced to live along that line. If a generalization could be deduced at all from a pattern of villages along the foot of the scarp, then it must be deduced from the collective behavior of the human beings concerned. Motivation in individual cases in this example would vary enormously, but taken as a mass the human reasons may be generalized and stated as a sociological law. Again there is nothing in a mere hilltop compelling men to use it as a defensive site; any compulsion to make such a specific use of a hill top arises inside the society, from a state of tension or of actual warfare. Physically it is a site; sociologically it becomes a defensive site.

CAUSE AND EFFECT

To many people, including Mr. Martin, the concepts of law and of cause and effect are so intimately bound up that they can never be separated. The former is thought of as an expression of the latter. It is so in classical physics. But there is great danger in giving to cause and effect an objective reality which they may not really possess. They are after all categories of thought, tools of logic. For those determinists who tie themselves to cause and effect no allowance is made for the inadequacy of the tool. The very perfection with which it is invested should, however,

be a warning that it is a "logical chain of inference"—it is perfect by definition, but it might not necessarily correspond to a chain of circumstances in a range of observed phenomena.¹⁹ But Martin at least is adamant that they must be accepted: "If we are to believe at all in cause and effect we must believe in their absolute rigourousness. There can be no exceptions."²⁰

Well though this concept of cause and effect has served the physical sciences up to the present time, and although it has by no means been replaced, its inadequacy is being very seriously questioned by many.²¹ The principle of indeterminacy, one of the most interesting outcomes of quantum mechanics, refutes strict causation and is a serious challenge to science to find a new frame of reference. There seems to be no justification for geographers at this stage to seek to find a basis for environmentalism in a category of thought which is held by many to be no longer adequate. The inadequacy of strict causality lies in the study of the microcosm, and as already pointed out, this has led some observers to think in terms of quantum laws and to suggest that the reason indeterminacy is not observed in the macrocosm is due to its being statistically eliminated on the larger scale.

The philosophical implications of such a proposition are legion; but they are better left to the philosophers to discuss, for they certainly lie outside the immediate scope of the geographer's work. It need only be pointed out that if the geographer's working belief is going to be based on a philosophical concept of the nature of truth, there is no reason, from a scientific standpoint, why this deeper concept should be exclusively causal-deterministic.

In the meantime the categories of cause and effect seem to have served a purpose in the description and analysis of the macrocosm without necessarily revealing the structure of reality. In the common sense world they have enabled scientists to discuss the links behind concomitance; they have suggested working hypotheses to explain data so far examined; but we need not make it inevitable, nor expect to find it exclusive. Once more it should be stressed that we are interested more in "how" something happens than "why."

If the cause and effect chain is accepted as a working belief, one major difficulty lies in isolating individual cause and effect. Martin questions whether a single cause or a single effect exists, or whether it is possible to call a halt in tracing back a series of causes and effects to an ultimate cause.²² Montefiore and Williams aptly describe the latter as a "reaction of panic."²³ One would either trace all phenomena

¹⁹ Toulmin, *op. cit.*, pp. 162-165.

²⁰ Martin, *op. cit.*, p. 5.

²¹ E. Schroedinger, *Science and Humanism* (Cambridge, 1951), pp. 26 *et seq.* J. W. N. Sullivan, *Limitations of Science* (London, 1934), p. 105: "We believe, or rather we have hitherto believed, that every event in nature is an example of cause and effect. The possible exceptions are provided by those actions which are the result, we say, of free will. . . . The principle of indeterminacy has profoundly changed this outlook." P. 108: "When Eddington says that something analogous to free will must be put at the basis of physical phenomena, he means more than a pragmatic rule, something more than a temporary mathematical device, and that it belongs to as fundamental a category as does the notion of strict causality."

²² Martin, *op. cit.*, p. 4.

²³ Montefiore and Williams, *op. cit.*, p. 4.

back to a single cause or trace any one single effect back to an infinite number of causes. From a practical point of view either process would be nonsensical. Martin gets round this by the introduction of "part-causes"—i.e., phenomena which have only a contributing influence; whereas Montefiore and Williams restate the problem in terms of "sufficient" and "necessary conditions." Another point which these latter make is more significant for the practical geographer: "All explanation is against a background."²⁴ Each problem is inexplicable outside the context in which it is framed. Within any specific context many trivia can be eliminated as belonging to the background and taken for granted. One assumes knowledge of the background, and that changes occur against this knowledge. This limits, both in time and space, the conditions which must be taken into account to explain a given phenomenon. We would never agree in practice that "we cannot place a limit to the duration of the effect of a given cause, nor . . . call a halt to our backward progress through time in an effort to discover the full or ultimate cause of any effect." It would be meaningless to search for such an ultimate; but what we can and must do is to retrace our steps until all the ecological factors involved have meaning in terms of the geographic circumstance. The problem dealt with must be placed against a known background, framed in a given context. In such a context could be examined groups of relationships—rather than isolated causes—which contribute to the circumstance. This also avoids defining immediate causes as arbitrarily defined stages—i.e., calling a halt at a preconceived stage which would fit in with whatever hypothesis needed proving. For example, it is tempting for a human geographer to call a halt at the stage immediately preceding the phenomenon being explained, and find human volition operating in selection, as in possibilism; a physical geographer could go back a stage further to the determinist attitude of showing what in the physical environment prompted the human decision.

Explanations do not necessarily lie in such simple, clear-cut stages, preceding one another in an orderly fashion, but in a whole nexus of complex circumstances. The apparent progressive stages are intellectual categories. There does come a stage, however, in which the problem rests against its immediate background, and this may seem to have a greater objective validity when it refers to major stages and syntheses in the total culture. The geographer readily recognizes such stages—points of "syncretism" as Mumford calls them²⁵—when he refers, for example, to the industrial revolution in Britain. The use of such a broad category undoubtedly involves as many arguments about defining limits as would the loose use of the word "region" in describing an area of land. But what can be readily recognized is that at a certain point of time cultural attainments in technics and in values become synthesized into something recognizable and labelled.

The human geographer cannot ignore this historical and cultural background.²⁶ It has to be the frame of reference within which he seeks his explanation. He can

²⁴ Montefiore and Williams, *op. cit.*, p. 6.

²⁵ L. Mumford, *Technics and Civilisation* (London, 1946), p. 107.

²⁶ C. D. Forde, "Human Geography, History and Sociology," *Scottish Geographical Magazine*, Vol. LV (1939), pp. 217-235.

neither discuss the growth of an industrial city nor describe an industrial landscape without reference to the historical elements in the syncretism. Most of the elements in such a city or landscape reflect and belong to a certain technological stage in the culture, and it is here that a halt must be called to the backward retreat in search of explanations; here, where all the strands have been woven into a pattern. It is this pattern which is central for the geographer. He is interested in the single strands only when they become a part of the pattern in a series of recognizable interrelationships. A determinist might be tempted to argue that ultimately an industrial landscape can be traced back in a causal chain to the presence of coal and iron, and he might call in the aid of part-causes to explain the change in landscape pattern. But such physical elements as he emphasizes were quite meaningless until a certain technological stage had been reached. The emergence of a geological factor in the environment, e.g., the presence of coal, as a geographical factor can be pinpointed only by a historical fact. The human geographer can go back as far as this point. There is no justification in going further. Here lies the crux of the change in the landscape, the emergence of those features which the geographer set out to examine and explain. This point of reference, or background, against which the human geographer seeks his full explanations, must include the historical situation, the cultural assessment, at a particular stage, of the physical environment. Mere concomitance is not enough. The geographer must analyze the situation at the point at which it arises—to go further back is meaningless; to be content with the present, inadequate.

A fundamental premise which is implied in the foregoing paragraph is this: that our main task is to find a reasoned explanation for a phenomenon which is geographical—i.e., the “effect” is the center of the study, and the wider the context of causes which are examined the fuller will be the explanation. This is radically different from the concept that the geographer’s task is to examine one “cause”—the geographical, whatever that may mean—in many which give rise to a non-geographical “effect.”²⁷ The latter can be interpreted as limiting our subject to the strictly physical elements in the landscape, a restriction which would make nonsense of the entire study of human geography.

SUMMARY

To sum up briefly: Firstly, the laws we invent are generalizations covering a vast number of data, not the laws of command which strict determinism suggests. If we find analogies in social laws it is because we must work on statistically derived means of behavior, rather than on the seemingly exclusive categories—like cause and effect—of the physical sciences. Secondly, the search for ultimate causes is as meaningless as the limiting of geography to examine one cause among many. Each circumstance must be set against the historical frame of reference wherein its origin lies, and it is in that context that the geographer will most nearly approach the solution of causes.

²⁷ Martin, *op. cit.*, p. 9.

THE AGRICULTURAL BACKGROUND OF SETTLEMENT IN EASTERN NOVA SCOTIA*

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LOCATED in a section of the country generally recognized as marginal for commercial agriculture, Antigonish County, Nova Scotia, points up in a remarkable way many of the agricultural problems of its province and the surrounding Maritime area. The most apparent of these include the emphasis upon subsistence and part-time farming, the high degree of farm abandonment, the need to purchase large quantities of feed grains and commercial fertilizer, and an unfavorable situation with respect to markets.

Following confederation, agriculture in Antigonish and in the rest of Nova Scotia expanded to a peak in the decade 1881-91. Then as the general movement toward specialization gained momentum, the rural economy of self-sufficiency began to break down. Small rural industries moved to urban centers; poor land went out of production and good land was hard pressed to meet competition from newly developed parts of the continent. Rural population declined, the number of farms declined, and the area in farmland and cropland declined.

Nowhere in Nova Scotia is this decline more marked than in Antigonish County. Between 1891 and 1951 the total population declined from 18,060 to 11,971, the number of farms from 2,710 to 1,164, and the area in improved land from 142,588 to 34,934 acres.¹ The declines in acreage and production of the principal crops—hay, oats, and potatoes—have not been as marked because they have been accompanied by increased yields per acre as production kept moving to the better lands. There has also been a steady decline in all classes of livestock, although the proportion of sheep has remained higher here than elsewhere in the province.

Basically this decline was part of the much larger economic picture in which the dominant force was continental expansion in Canada and the United States. But Antigonish, more than any other part of mainland Nova Scotia, found itself unable to adjust to changing agricultural conditions. Physical handicaps—a short growing season, occasional summer drought, and rugged topography—and the economic handicap of lack of ready markets undoubtedly contributed to the decline. But these are difficulties shared by the rest of the Maritime area. Where the county stands unique is in the high proportion of its land area that was occupied in the period of early settlement. Seventy-three percent of the county was in farms in 1881, a proportion higher than in any other county in the province. The high proportion of land occupied meant a high proportion of subsequent abandonment. A basic factor in both occupation and abandonment was the agricultural

* This study was supported by a grant from the Graduate School, Indiana University, where I served on the faculty when the paper was prepared.

¹ Figures from Census of Canada.

background of the settlers, a background that has colored developments in eastern Nova Scotia to the present day. It is with this background and its significance that this paper is concerned.

ORIGIN OF SETTLERS

The first actual settlements were those of the Acadian French in 1768, returning after their expulsion from Nova Scotia and taking up land at Tracadie, Pomeroy, and Havre-au-Bouche on the mainland, and at Cheticamp and Arichat on Cape Breton Island.² Sixteen years later the first settlement was made by the English with the arrival at Antigonish Harbour of a number of officers and men of the Nova Scotia regiment. These were followed in 1795 and 1796 by the arrival of a small number of Scottish Highlanders who, with a few disbanded Highland soldiers, were located by the government along the north shore of Antigonish and adjacent Pictou. The Highland trickle became a stream with arrivals in 1800, 1805, and 1810. The enumeration of 1827 listed a population in Upper Sydney (now Antigonish) of 7,724.³ A check of the names on the enumeration rolls reveals that more than two-thirds were Scottish. If the eastern township of Tracadie with its Acadian French is excluded the proportion is more than 80 percent. More strikingly, the Scottish were almost entirely Roman Catholics, and thus definitely Highlanders. The proportion of non-Catholics among them was a little over 10 percent.

Where did these Scottish Highlanders come from? Some indication is provided by place names in the county. The exiled Scots newly arrived in a strange land liberally sprinkled it with names of home (Fig. 1). Arisaig, Moidart, Knoydart, Lochaber, Keppoch, Strathglass, and many others recalled districts and villages in the Scottish Highlands, and more precisely sections in the county of Inverness.

Written records bearing on emigration yield little. "Nothing can be more difficult to trace," writes Cowan, "than the movements of peoples who, leaving no written records themselves, sail from a land which affords a harbour to almost every estate and who arrive in a country where the lack of a well-regulated land system permits the newcomer to take up his abode in an uncharted wilderness."⁴ Neither their going nor their coming was set down. The commercially rewarding emigrant trade was usually carried out under conditions of great risks to the passenger. Ships were overcrowded; there were no medical facilities on board and usually not sufficient food. Understandably ship operators and others engaged in the trade were as eager as possible to escape detection.

² Richard Brown, *A History of Cape Breton Island* (London, 1869), p. 53.

³ "Statistical Return of the Upper District of the County of Sydney, 1827", *Report, Public Archives of Nova Scotia for the Year 1938* (Halifax, 1939), pp. 23-67. The enumeration is described as one "made with great care and accuracy" by Thomas C. Haliburton in his *An Historical and Statistical Account of Nova Scotia*, Vol. II (Halifax, 1829), p. 276 f.

⁴ Helen I. Cowan, *British Emigration to British North America, 1783-1827* (University of Toronto Studies in History and Economics, 1928), p. 17.

Some pertinent data for the years 1801, 1802, and 1803 are supplied by Brown⁵ who provides a list of vessels carrying emigrants from the Highlands to Nova

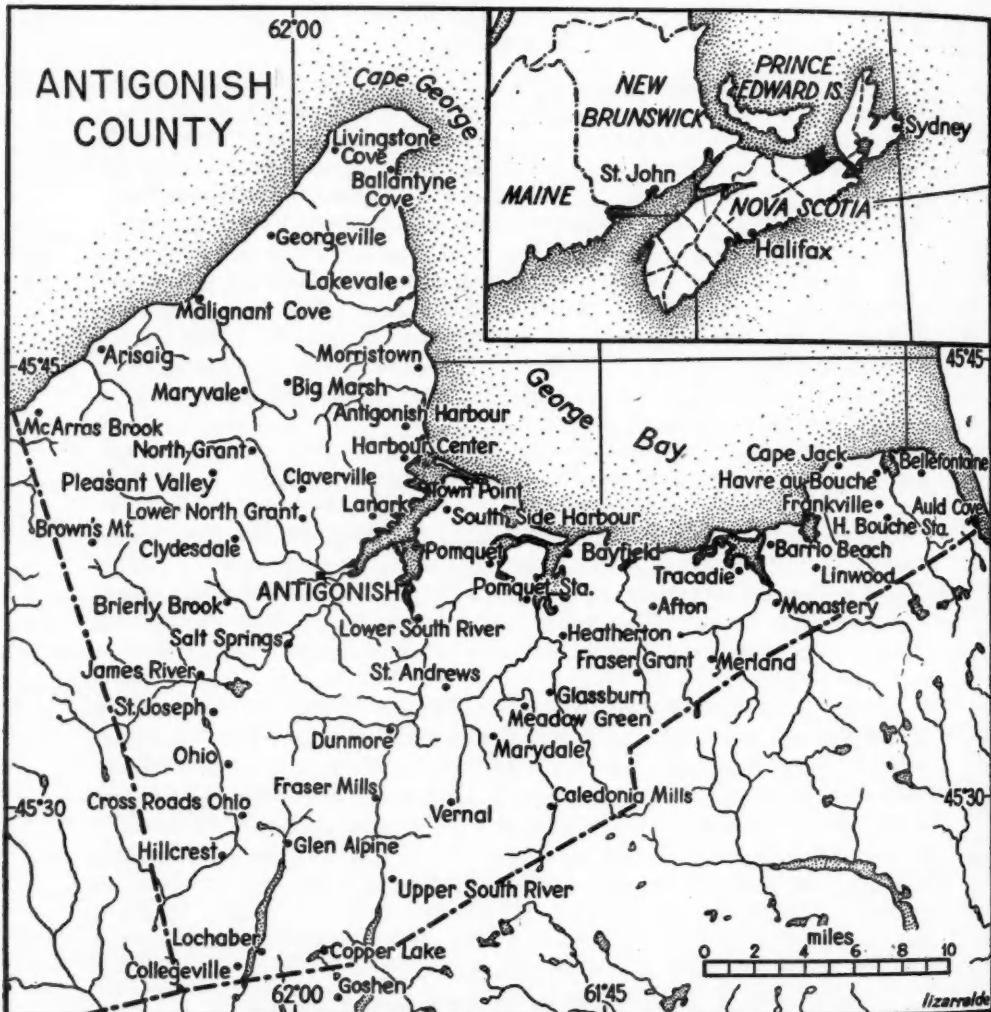


FIG. 1. Antigonish County, Nova Scotia. Location and place names.

Scotia, together with total passengers aboard, origin of the settlers (by districts and estates), and, occasionally, ports of landing. The statement, however, is far

⁵ Robert Brown, *Strictures and Remarks on the Earl of Selkirk's Observations on the Present State of the Highlands of Scotland* (Edinburgh, 1806), Appendix.

short of the actual emigrants for, as noted by a House of Commons committee of the time, "A very extensive tract of coast is not included from whence many vessels sailed and also because even on the coast which is included . . . many vessels are believed to have sailed from unfrequented Bays and Creeks which have entirely eluded inquiry."⁶ Defective as the account must be it does specify vessels and places of origin and is useful for corroboration.

The basic source of information for the origin of the settlers is Rankin's genealogies.⁷ These provide a complete list of important family names with occasional notes as to place of origin and dates and places of arrival. This information together with that on the enumeration rolls of 1827 makes it possible to determine where the Highlanders came from in Scotland and where they settled in Antigonish. The material cited previously and scattered Scottish comments to be noted later confirm the picture.

The bulk of the Scots were MacDonalds and Chisholms, family names accounting for approximately 41 percent of the total Scottish names in the 1827 census. The MacDonalds (of Clanranald and Keppoch) came from the districts of Moidart, Knoydart, Arisaig, Eigg along the west coast and from Glenroy and Glenspean in Lochaber (Fig. 2). The Chisholms came almost entirely from Strathglass in the eastern part of Inverness. Families of fishermen, MacNeills, Livingstones, and Ballantynes, came from the Island of Barra. Camerons and MacMillans came from Lochaber, and Gillis families came from Morar. These are the important family names. Others could be mentioned, but they are minor and reveal no new places of origin. Antigonish was settled by Highland Scots from the districts of Inverness-shire listed above.

INVERNESS-SHIRE

In many ways Inverness-shire epitomizes the characteristics of the Scottish Highlands. It occupies a central position on the dissected plateau of schist, gneiss, and other metamorphic rocks typical of the Highland country. The southwest-northeast alignment produced by the Caledonian mountain building finds its best expression here in the valley of Glen More. Rejuvenation following peneplanation has left many glens, steep slopes, lakes, and waterfalls. Glaciation has resulted in over-deepened valleys, numerous morainic piles, and valley floors covered with drift.

Inverness is dominated by hills, mountains, and highland (Fig. 2). The only extensive areas under 650 feet (200 meters) elevation occur along some of the streams and in the northeast around Moray Firth where a lowland plain has developed on the shales and sandstones of the Old Red Sandstone formation. Activity has always been concentrated in these lower areas. It was the valleys that fostered and promoted the Highland clan system and later provided the best

⁶ *House of Commons Papers*, Report from the Committee on the Survey of the Coasts and Central Highlands of Scotland . . . Relating to Emigration, Series 80, Vol. IV (1802-1803), p. 38.

⁷ D. J. Rankin, *A History of the County of Antigonish, Nova Scotia* (Toronto, 1929). The genealogies occupy pages 78-375.

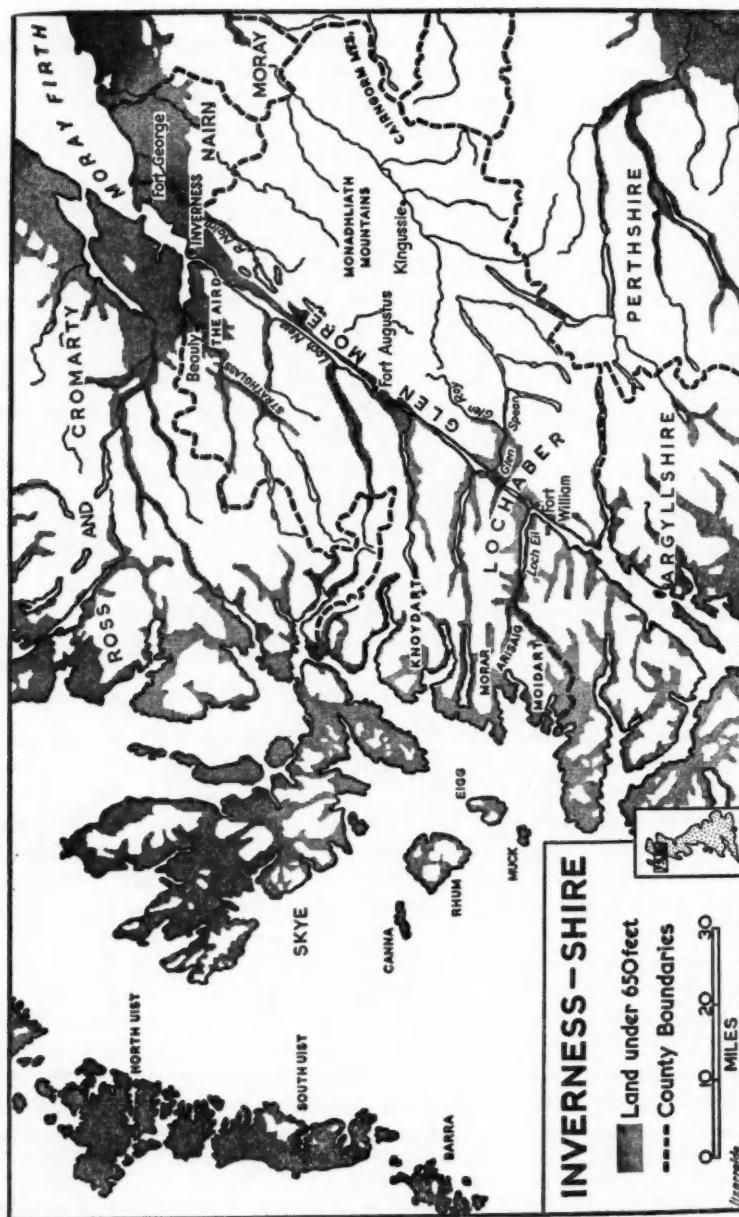


FIG. 2. Inverness-shire. Scotland.

land for a booming sheep industry. And it is in some of these valleys today that an attempt is being made to revitalize the Highlands by converting the flatlands to ranches.

The traditional climatic contrast drawn in the Highlands is that between a

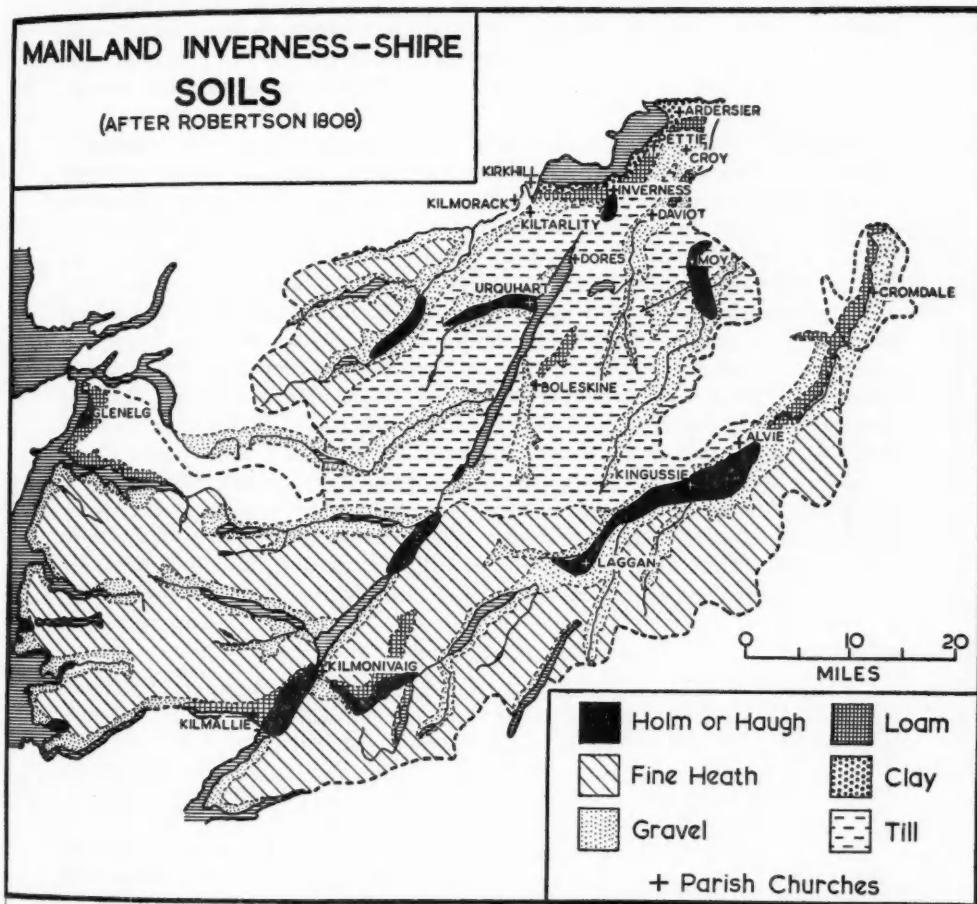


FIG. 3. Mainland Inverness-shire. Soils and parish churches, 1808.

mild and humid western side and a dry and continental eastern side. However, this is mountain country and averages mean little, especially with respect to temperatures. Precipitation does vary markedly from west (over 60 inches; in some places over 100 inches) to east (24 to 26 inches). Rain days "number 250 to 260

per year in the west and are much less numerous in the east."⁸ Too much rain, rain during planting and rain during the harvest, has always been prominently cited as the chief foe of the Highland farmer. Robertson describes a common harvesting procedure in the county in which oats were set up in single sheaves, pointing out that "the season is so rainy in most places that by this method alone can the crop be saved."⁹ The situation was further aggravated by the failure of tenants to provide even the barest drainage facilities. Handley uses the wet climate to help explain the general listlessness and laziness of Highland farmers noted by English travelers in the 18th century.¹⁰

Because of the excessive moisture and low temperatures, soil cover is generally peaty. On Robertson's soil map (Fig. 3) the most productive soils, as he saw them in 1808, appear as holm (or haugh) and loam. The holm is alluvial soil found in places subject to periodic flooding. Loam, a term which Robertson applied to any place where the land was fairly productive without the presence of clay, is the most fertile and at the same time the most restricted of the county soils. The extent of both of these alluvial soils is limited because of the steep gradients of most of the streams. As a result extensive areas of sand and gravel have been the most common legacy of flood waters. The bulk of the county is classed as till, divided on the basis of cover into till and fine heath. The former apparently includes all steep and stony land more or less barren of vegetation, mountains and hills that were "gloomy, black and sterile." Where the till was covered with a mixture of grass and heath or where the heath was short and fine the designation "fine heath" is used. Robertson had high hopes for the fine heath of the county, maintaining that "the industry of man will banish heath and introduce verdure upon any spot."¹¹ Such achievement never came to pass, but portions of the fine heath have continued as important pasture lands from Robertson's day to the present.

AGRICULTURE

Generally speaking, Highland agriculture in the late 18th century still possessed many of the features of early Scottish farming from which the Lowland counties had already emerged. "The feudal system has been abolished," wrote Selkirk, "but the customs that arose out of it are not forgotten."¹² The open field system

⁸ C. J. Hunt, "The Mainland of Inverness," pp. 601-661 in the "Highlands of Scotland," parts 9-12 of *The Land of Britain* (London, 1944), p. 610.

⁹ James Robertson, *A General View of the Agriculture of the County of Inverness* (London, 1808), p. 149. This is one of the county surveys of agriculture carried out under the Board of Agriculture and Internal Improvement for Scotland instituted in 1795. Since Robertson was a minister of the Church of Scotland, some of his ideas tend to be utopian, but his zeal and energy in visiting every significant part of the county whether easily accessible or not, and his care in describing what he saw, have left a valuable record of agricultural conditions of the time.

¹⁰ James E. Handley, *Scottish Farming in the Eighteenth Century* (London, 1953), p. 37.

¹¹ *Op. cit.*, p. 13.

¹² Earl of Selkirk, *Observations on the Present State of the Highlands of Scotland* (Edinburgh, 1806), p. 12.

prevailed. Farmers lived in small groups of dwellings and cultivated a number of non-contiguous strips. The division of land into strips, usually separated by lower, marshy tracts not suitable for cultivation, was known as "runrig" and was accompanied by the infield-outfield layout of farms. The infield, or area closest to the dwellings, received most of the manure and was continuously cropped. The outfields farther away were manured only during summer and autumn when cattle were kept in folds over night. The fields were then cropped as long as the land could produce any grain. Beyond the outfield lay waste, moor or hill land, usually held in common and used for pasture.¹³

Land in the county was most commonly held under tacksmen or gentlemen farmers, part of the legacy of the period of Highland clans. As the chiefs of the clans turned from war to more peaceful pursuits, certain cadets of the family were given leases of large tracts of land. Out of these they carved domains for themselves with the help of tenant labor and tenant production for rent.¹⁴

The Highlander was not an outstanding farmer. He had always been a soldier and the sword came more naturally to his hands than the plow or the spade. "The conditions of his life, not to speak of the character of the soil, prevented him giving much attention to the tillage of his fields."¹⁵ Robertson lamented that the "greater part by far of the county is in the hands of persons exceedingly ignorant of the modern improvements in respect of tillage . . . crooked ridges . . . obstructions to the plough in every field . . . the furrows turned over in a clumsy manner . . . with every other sign of ignorance and inattention."¹⁶

The most common grain crop was oats, "universally a gray-bearded or black oat, little better than the seed of a good rye grass."¹⁷ But even the best variety of oats tended to degenerate and take on a grey or black appearance under the effect of the wet Highland climate. Barley ranked next to oats. This again was a variety peculiar to the Highlands, generally known as Scottish bere (or bear) or bigg. It required a shorter growing season than ordinary barley and produced a better crop on poor land and in wet weather.¹⁸ Hay was not cultivated as a crop but was obtained as bog hay from poorly drained, uncultivated land.

The potato was extensively cultivated by the end of the 18th century and recognized as the food crop without equal. It had been strongly promoted in Inverness and other counties by the Commissioners of the Annexed Estates who issued detailed instructions and offered premiums "for Raising and Preserving Potatoes . . . observing that there is almost every year a scarcity of meal and other provisions in the wilder portions of the Highlands."¹⁹ Robertson noted with satis-

¹³ The description is based on Robertson and statistical reports quoted later.

¹⁴ Handley, *op. cit.*, p. 93.

¹⁵ J. Cameron Lees, *A History of the County of Inverness* (Edinburgh, 1897), p. 265.

¹⁶ *Op. cit.*, p. 120.

¹⁷ *Ibid.*, p. 144.

¹⁸ Handley, *op. cit.*, p. 54.

¹⁹ Scottish Register House, Forfeited Estates Papers—Papers connected with the promotion and improvements in agriculture and fisheries, 1745-85. (F. E. Inventory, p. 96, Item 5.) Unpublished.

faction that "every householder from the highest to the lowest order of his family has potatoes for his family."²⁰

The chief, and in most cases the only commercial product of the Highlands, were black cattle, fed on hill pastures in the summer and on whatever else could be spared during the rest of the year. Sheep numbers were greatly increasing in the county at the end of the 18th century, Robertson noting an increase from 25,000 to 50,000 in the period 1794 to 1804. The old indigenous sheep, which was small, fine woolled, and all white, was still common and so was the Linton or black-faced breed. And stocks of Cheviot sheep, introduced by the sheep farmers from the south who had taken up cleared lands, were becoming important. Next to hogs, against which Highlanders had a strong traditional prejudice, horses probably received the least attention of all livestock. They were raised in large numbers and were generally inferior animals because of starvation diets on which they had to subsist. Numbers declined sharply as more sheep were introduced and took up greater shares of the hill pastures.

Apparently in most districts all livestock pastured together and there was little attempt to watch that the animals did not stray. As a result there was virtually no control over breeding. The Rules and Articles of the Commissioners for Managing the Annexed Estates contains a provision that "all and each of the tenants shall be obliged to herd their horses, black cattle, sheep and other bestial, in the winter as well as the summer, under the penalty of one-half a merk Scots for each beast found upon a neighbor's ground or farm."²¹

STRATHGLASS

The portion of the Highlands known as Strathglass in the 18th century included the valleys of the Grass and Beauly rivers (Fig. 2). It formed part of the two Church of Scotland parishes of Kilmorack and Kiltarlity, the former on the north side of the river, the latter on the south side (Fig. 3).

The valley is one of the simplest and most clear-cut glens in the Highlands with a remarkably flat floor and an abrupt rise to the hills on either side. Robertson wrote of it as "all either hill or a dead flat of land formed by water."²² Unfortunately the soil on the flat is largely sand and gravel, and, as described in a later report, "thin and light [and] very difficult to trench . . . from the number of stones."²³ Under such conditions a great deal of labor and heavy applications of lime and manure were a prerequisite to successful crop production. It is no surprise, then, that cultivated crops were a minor part of the agriculture.

²⁰ *Op. cit.*, p. 153.

²¹ Scottish Register House, Bught Papers, 1761-1875 (Box 21). Unpublished.

²² *Op. cit.*, pp. 18, 24.

²³ *The New Statistical Account of Scotland* (hereafter referred to as N.S.A.), Vol. 4 (Edinburgh, 1845), p. 484. The Statistical Accounts, New and "Old," provide the basic material for the descriptions of Strathglass and the other areas that follow. The parish-by-parish reports, which make up these accounts, were drawn from the communications of ministers throughout Scotland and first arranged by Sir John Sinclair. They vary in length and quality but for the most part supply firsthand information for which there is no substitute.

It was just to the east of Strathglass that the first Inverness-shire agriculturists, the monks of Beauly, tilled the land and planted crops. English travelers commonly noted the beauty and fertility of the area around the monastery. But although the Aird, as it was known, might have been an object lesson to part of Strathglass it had no effect upon agriculture there. Apparently there was no contact between the two areas. Then, too, the poor soils in the Strath, compared to the more arable land associated with the old red sandstone formation in the Aird, was a definite handicap.

On the maps of the Roy Survey of Scotland some indication of the land utilization of the area appears.²⁴ The concentration of activity on the flats of the river is apparent, along with the arrangement of fields. All of the fields are small, a fact that was looked upon by more than one of the parish writers as a great disadvantage.²⁵ There is no evidence of enclosure. The villages or clusters of houses are named and the extent of woodland is shown. The river flats seemed to have been devoted largely to pasture. One writer observes that "in this Strath . . . is a great deal of good pasture for black cattle, sheep, and goats. South . . . is very high ground all covered with heath and only fit for pasturing sheep and goats."²⁶ The writer for Kilmorack declared that "it is impossible to ascertain the number of cattle," adding that a "great number" were annually sold for the south of Scotland and English markets.²⁷ The same author points up the importance of potatoes. "Within these 20 years," he writes, "the Laird of Chisholm's tenants in the height of Strathglass were in the constant practice of purchasing yearly oat meal, but during the 12 or 14 years past they have paid so much attention to their potatoe [sic] crop that they are not under the necessity of laying out £5 in the year for meal."²⁸

Sheep were not important in the parishes before 1800. There is no mention of sheep farms in the Old Statistical Account. By the time of the New Statistical Account, however, the situation had changed. The Kiltarlity author writes of the "considerable extent" of sheep farming and describes the woods which provided winter shelter as "abounding in sheep walks."²⁹ Even today the aspect of the glen is predominantly pastoral. But the sheep ranch has given way to the cattle ranch, with sheep relegated to the steep hillsides. The small amount of land in crops bears out the soundness of similar land use in the Strath over 150 years ago.

²⁴ The Survey was a careful piece of field work and showed open fields, enclosed fields, plantations, natural woodlands, rough hill land, marshes, roads, buildings and villages. Since it was completed before 1754 it is of limited use for a discussion of agriculture in 1800. The results of the Survey are summarized by Andrew C. O'Dell, "A View of Scotland in the Middle of the 18th Century," *The Scottish Geographical Magazine*, Vol. 69 (1953), pp. 58-63.

²⁵ *The Statistical Account of Scotland* (hereafter referred to as S.A.S.), Vol. 13 (Edinburgh, 1794).

²⁶ S.A.S., Kiltarlity, Vol. 13 (Edinburgh, 1794), p. 510.

²⁷ S.A.S., Parish of Kilmorack, Vol. 2 (Edinburgh, 1798), p. 406.

²⁸ *Ibid.*, p. 405.

²⁹ N.S.A., Vol. 14 (Edinburgh, 1845), p. 502.

LOCHABER

Lochaber lies on the other side of the "divide" from Strathglass, the divide between the dry east and the humid west. This is the rougher side of Britain with steeper slopes, more numerous streams, and smaller fields and farms. "The most mountainous parish perhaps in the kingdom" is the description in one report.³⁰ Pennant notes that "Lochaber had been a den of thieves and as long as they had their waters, their torrents and their bogs in a state of nature, they made their excursions, could plunder and retreat with their booty in full security."³¹

With the break-up of the clan system Lochaber became an important cattle producer. In his tour of 1769 Pennant observed the importance of cattle in Lochaber noting that the district alone sent out more than 3,000 head annually. There were also few sheep at this time, but their numbers were being rapidly increased. "There is scarce any arable land," he notes, "for the extensive wet which reigns here almost totally prevents the growth of corn. . . . The inhabitants of this district are therefore obliged, for their support, to import 6,000 bolls of oatmeal annually."³² By the end of the 18th century sheep farming had become the dominant industry. Their numbers in the parish of Kilmonivaig in 1796 were set down as 50,000 compared to 1,500 black cattle and 500 horses.³³ By 1842, sheep had increased to over 100,000.

Most of the Antigonish emigrants from Lochaber came from the valleys of Glenroy and Glenspean in the parish of Kilmonivaig, one of the few Highland parishes whose population was more than one-half Roman Catholic.³⁴ These glens contain large areas of flat land, mostly holm and loam (Fig. 3) which apparently were neglected. "In Glenspean alone," writes the Kilmonivaig author in 1842, "there are upwards of 40,000 acres of excellent soil, which by the application of skill and capital could be brought into cultivation."³⁵ He goes on to blame absentee landlords, poor management, and lack of inducements for the small amount of cultivation. Today the same glens are still marked by a lack of cultivation. The crofters who live here are not farmers. Most of them work in nearby Fort William and raise a few sheep and keep a cow or two as a supplementary activity. Movement out of the area is heavy. The population in Roybridge Parish declined from 1,000 in 1870 to less than 300 in 1950.

THE WEST COUNTRY

The western districts of Knoydart, Morar, Arisaig, and Moidart,³⁶ now as in

³⁰ N.S.A., Parish of Kilmonivaig, Vol. 14 (Edinburgh, 1845), p. 503.

³¹ Thomas Pennant, *A Tour in Scotland and Voyage to the Hebrides*, Vol. 1 (Edinburgh, 1775), p. 204.

³² *Ibid.*, p. 208.

³³ S.A.S., Vol. 17 (Edinburgh, 1796), p. 544.

³⁴ One of the great "finds" of the author's own tour of the Highlands were the remains in Glenspean of the village of Achnacoinmhachan, abandoned by families who settled in Antigonish.

³⁵ N.S.A., Vol. 14 (Edinburgh, 1845), p. 505.

³⁶ The districts lie in two parishes. Moidart, Arisaig, and South Morar are in Archaumurchan, whose parish church is in neighboring Argyllshire. North Morar and Knoydart are parts of the parish of Glenelg. (Fig. 3.)

the 18th century, are the loneliest and most isolated on the country mainland. To the ever-present rugged topography of mountains, hills, and high moors must be added such features as the long distance from main centers, the deep penetrations of sea lochs effectively preventing land movement, and one of the most disagreeable climates in northwest Europe. Excessive precipitation is repeatedly mentioned as a cause for crop failure. Deluges of rain, followed by floods might postpone harvests until November. On top of this the destruction wrought might then render the crop useless. "Such quantities of rain follow," writes one author, "and at all seasons that an agriculturist might calculate on losing almost every fourth crop."³⁷ No wonder that, in the words of Hunt, "the pulse of life beats but feebly, activity of any sort, agriculture or otherwise, being at a discount."³⁸

Again the raising of livestock was the chief activity in the 18th century. The practice of going to the "shealing," that is, moving to the hills beyond the inhabited areas for pasture, was still important. It is mentioned for Knoydart and Morar in 1774,³⁹ and was probably common in the other districts as well. Robertson describes the procedure.⁴⁰ Every year in June after the crop was sown and the peat cut for fuel, whole families would move to the far-off hill pastures. Here they would live simply, subsisting on milk from herds and a bit of meal and moving from place to place as the pasture was used up. Occasionally some member of the family would return to the farm in the lowlands to hoe the potatoes, weed the crop, and collect fuel. This type of nomadic herding persisted until the end of the century when the pastures were withdrawn from the farmers and let to shepherds.

The Catholic proportion of the population was higher here than in any other part of the Highlands from which emigrants left for Nova Scotia. In 1798, out of the total population of 1,990 in Moidart, Arisaig, and South Morar, 1,896 were Catholic.⁴¹ The population was scattered in small hamlets on flat land near the sea. Occasional mention is made of small areas of light or gravelly soil yielding oats, barley, and potatoes. In contrast to Strathglass there seems to have been very little natural meadow because of the need to utilize the small amount of flat land for tillage. In some parts of Moidart cultivation was practiced on land so rocky and broken that neither horse nor plow could be used, and the only implement for turning up the soil was the caschrom, a clumsy heavy spade with a crooked handle. In contrast, on the more level land seven or eight horses might be employed. This extravagant use of stock seems to have been general in the whole county. In many places eight oxen were yoked to one plow. "Inconceivable," snorts Roberston. "It might with equal propriety [be] 80."⁴²

The same Robertson refutes the charge that West Coast Highlanders were

³⁷ *N.S.A.*, Vol. 14 (Edinburgh, 1845), p. 138.

³⁸ *Op. cit.*, p. 656.

³⁹ Society for the Propagation of Christian Knowledge (hereafter referred to as S.P.C.K.), "The Present State of the Highlands and Islands in Scotland," in *An Account of the Society . . . for 1774* (Edinburgh, 1775).

⁴⁰ *Op. cit.*, p. 197.

⁴¹ *S.A.S.*, Vol. 20 (Edinburgh, 1798), pp. 290-295.

⁴² *Op. cit.*, p. 121.

lazy and poor workers, by pointing to their efforts in making composts for their potato crop. In Moidart the compost was a common sight outside the cottage door. It was made up of moss, dung, seaweed, and berries. The material from the sea was carried up from the shore on people's backs up slopes too steep to be negotiated by horses.

Today, the west country is largely a land of small crofters, dependent as their 18th century forebears had been on cattle, hay, and potatoes. But this is not enough to provide a living for most of them. There is little outside labor available, as in Glenspean and Glenroy. There are, however, two other sources of income, government agricultural subsidies and an increasing summer tourist industry. In common with the preceding sections of the county, population is declining.

BARRA AND EIGG

The island of Barra (Fig. 2) was one of the holdings of Roderick MacNeill at the time that its inhabitants were leaving in large numbers for eastern Nova Scotia. Many of these emigrants were fishermen or boatmen, and references to their ability on the sea provide one of the few examples of praise bestowed upon anyone in the West Highlands and islands. "The fishermen of Barra," writes MacDonald, "are the most active and prosperous now to be found in the Hebrides."⁴³

MacDonald divides Barra into four main physical divisions. It is significant that he relates each to the dominant agricultural activity, the raising of black cattle. The first division is that of mountains and valleys, about one-fifth of the island, of limited use for grazing,⁴⁴ but valuable for the kelp which collected in its sea inlets. The "machir," or sand wastes, one-tenth of the island, provided grass in the summer, but was more important as the source of sea shells used as manure throughout the island. A third division, designated as "grass and arable" occupied another tenth of the island, near the western shore, and it was here that most of the habitations were located. Its disadvantages were its poor drainage in the wet season. The rest of the island was "montich," a covering of deep moss over gravel, clay or granite, not productive, but a source of fuel and a place of shelter for cattle.

The most important activity and one carried on to the detriment of both agriculture and fishing was the manufacture of kelp. Barra was a kelp estate and kelp was king throughout the summer season when the inhabitants might have been attending to farming or fishing. The value of kelp as a commercial crop also meant that the use of seaweed for agriculture was greatly restricted. Kelp manufacture was also important on the mainland in the districts of Knoydart to

⁴³ James MacDonald, *General View of the Agriculture of the Hebrides* (Edinburgh, 1811), p. 791.

⁴⁴ This is MacDonald's contention. Another view is expressed in the *N.S.A.*, Vol. 14 (Edinburgh, 1845), p. 199. Here the mountains are described as "yielding to no other place of its extent in the Highlands of Scotland for pasture." The description is worth little, in the light of MacDonald's own careful investigations.

Moidart and although it began to decline after 1823, with the abolition of the tax on Spanish barilla, it was important in Barra as late as 1840, at which time it was still regarded as an obstacle to farm lands.⁴⁵

Kelp manufacture was also the mainstay on the small island of Eigg. The rearing of horses, cattle, and sheep on pastures of heath and coarse grass was the other important activity. Wool and horses were occasionally exported to Uist in exchange for meal. Local grain was scarce; it had to be sent to Arisaig to be ground, a difficult and expensive voyage as there was no regular communication with the mainland.⁴⁶ There was not much emphasis upon fishing, probably because the islanders could not afford the equipment. Consequently, the ever-present potato crop had to provide almost the entire means of subsistence.

AGRICULTURE AND EMIGRATION

On the basis of the foregoing descriptions and associated remarks in the references cited, it is possible to see certain relationships between agriculture and emigration in these sections of Inverness. The emigrants were farmers whose main activity had been the raising of cattle. But the cattle were inferior, small and rangy, because of the lack of feed. It is apparent that most tenants kept too many cattle. As a result, pastures were overstocked in the summer and it was necessary to plow even the stoniest and poorest lands in an effort to supply enough fodder to keep the cattle from perishing in the winter. The result was half-starved cattle and crops that in many instances were little better than weeds.

Of the crops raised, potatoes received the most attention and were always the most heavily manured. In most instances oats and/or barley followed and depended upon what was left of this manure. This was the sum total of rotation practiced. Hay was everywhere a natural crop, bog hay from poorly drained meadow lands. Composts varied a good deal, but usually left much to be desired. The best heaps seem to have been in the West Country where seaweed could be used. Here, too, shells provided lime. Elsewhere the application of lime in any form was rare.

A good deal of the blame for the low state of agriculture lay with the land owners who took a large part of the production in high rents, but did nothing to encourage improvement or to increase the fertility of the soil, which after all belonged to them. They also demanded service either on their own farms or in kelp manufacture in conflict with the tenants' own labor requirements.

In the late 18th century this old order of subsistence farming with cattle as the main rent-paying commodity was being replaced throughout the Highlands by large-scale commercial sheep farming. The change had made considerable progress in Inverness by 1790. It brought with it a complete upheaval of agriculture. Sheep farming meant an introduction into the Highlands of a south country "store-master" with south country shepherds, sheep, and dogs. Even the old Highland sheep were

⁴⁵ *N.S.A.*, Vol. 14 (Edinburgh, 1845), p. 213.

⁴⁶ J. MacDonald, *op. cit.*, p. 737.

swept away. They were too small, too unprofitable, and of too many varieties to play a part in the new system.⁴⁷

The emigrants to Antigonish were involved in this upheaval and were carried by it across the Atlantic. They brought with them none of the "new ways" because these were not part of their tradition. They were farmers of the old order, "black cattle and potato men," forced out, as they and later generations of Highlanders saw it, by sheep:

"The sheep with the brocket faces that have
made confusion in all the world
Turning our country to desert and putting
up the rents of our lands."⁴⁸

The bulk of migration to Antigonish took place in the period 1790 to 1810, the years of the peak migration from the Highlands. The extent of the movement was viewed with sufficient alarm to bring about the appointment of a House of Commons committee to survey the Highlands and ascertain the causes of migration. The most powerful cause the committee found was "the converting of large districts into extensive sheep walks. This . . . requires much fewer people to manage the same tract of country."⁴⁹ Another observation of the committee was that income from the sale of black cattle had facilitated migration by enabling farmers and former tenants to bear the costs involved.

The great migrations from Strathglass followed the clearances from the Chisholm lands in 1801. In Lochaber, sheep were "a strong temptation to proprietors who value money more than men. . . . They require a smaller number of hands than black cattle, can graze in places where they did not venture and yield a great produce."⁵⁰ Some attempts were made by proprietors to let lands for sheep farms among former tenants, but there was no enthusiasm for the idea from either side and it met with failure.

The West Country and the Islands witnessed the largest emigrations and here some population figures, faulty though they may be, are available. The population of Moidart in 1798 is given as 712 compared to a figure of "over 1200" eight years before. The number of emigrants to America "by whole families and of all ages" in 1790 and 1791 for the district is listed as 250. For Arisaig and South Morar the figure is 322.⁵¹ From the small island of Eigg 176 individuals left in 1788 and 1790.⁵² Sheep are again regarded as the main reasons for movement, but other

⁴⁷ J. A. S. Watson, "The Rise and Development of the Sheep Industry in the Highlands and North of Scotland," *Transactions of the Highland and Agricultural Society of Scotland, Fifth Series*, Vol. XLIV (Edinburgh, 1932).

⁴⁸ *Ibid.* The quotation is from a poem (translated from the Gaelic) by Duncan Ban McIntyre, written around 1800, entitled "The Song of the Foxes." The fifth line declares the theme, "My blessing be upon the foxes, because that they hunt the sheep."

⁴⁹ House of Commons Papers, *op. cit.*

⁵⁰ S.A.S., Vol. 13 (Edinburgh, 1793), p. 432.

⁵¹ S.A.S., Vol. 20 (Edinburgh, 1798), p. 432.

⁵² S.A.S., Vol. 17 (Edinburgh, 1796), p. 281.

causes "contributing to the evil" are also mentioned—"high rents . . . the increase of population and the flattering accounts received from friends in America."⁵³

One of the most comprehensive views of the causes of migration was taken by a reporter for the Society for the Propagation of Christian Knowledge in 1791. He attributed the blame not only to sheep, but also to the whole range of agricultural conditions then prevalent in the Highlands. These included:

The conversion of small into great farms to the exclusion of the inferior order of tenants . . . the prejudice against granting leases of a sufficient length to encourage the tenants to improve their farms. . . . The ignorance with which some landowners raise rents, while they furnish neither the means nor the instruction as to the manner by which the tenants may be enabled to pay them . . . the non-resistance of the proprietors and their . . . total want of attention to their people.

"At the same time," he concludes, "the great and most universally operating cause of emigration is that in comparison of the means of subsistence which they afford these countries are greatly overstocked with people."⁵⁴ Adam, writing well over a century later, came to the same conclusion: "The real cause of Highland distress and Highland emigration in the late 18th century is to be found in circumstances . . . entirely apart from the introduction of sheep. Briefly the Highland population was over-running its resources and unless positive preventive measures were taken emigration or migration on a large scale was inevitable."⁵⁵

The relating of population to resources raises a delicate question. It is obvious that the handicaps of a wet, fickle climate, poverty of soil, lack of shelter and sheer remoteness restricted the ability of these sections of the Highlands to support large numbers of people. It should be just as obvious that most areas were not producing anywhere near their full capacity in crop, stock, and pasture. Common to all areas was the absence of more intensive forms of production which could compensate in part for the small size of the holdings. This is still a problem in the Highlands.⁵⁶ It is also a problem in eastern Nova Scotia.

EARLY SETTLEMENT IN ANTIGONISH

The major period of settlement in Antigonish was between 1790 and 1810, although there are records of Highland Scots in the county as early as 1780, and immigration continued into the 1830's. Martell presents no evidence of Scottish migration into Antigonish between 1815 and 1838, but his compilation is based only on what is available from shipping records.⁵⁷

⁵³ S.A.S., Vol. 16 (Edinburgh, 1795), p. 269.

⁵⁴ S.P.C.K., "Report of the Secretary on a visitation of the Highlands," *Proceedings of the Society, 1791* (Edinburgh, 1792), Appendix.

⁵⁵ Margaret I. Adam, "The Causes of the Highland Migrations of 1783-1803," *Scottish Historical Review*, Vol. 17 (1920), p. 85.

⁵⁶ See *Report of the Commission of Enquiry into Crofting Conditions* (Edinburgh, 1954), Chapter II.

⁵⁷ J. S. Martell, *Immigration to and Emigration from Nova Scotia, 1815-1838* (Halifax, 1942).

The period before 1815 is significant because it was a time when nothing was being done officially to induce settlement. The strongest advocates of immigration were "neither those interested in the defense of the colonies nor in the general advancement of their prosperity. They were . . . men personally interested—merchants, ship owners, and land speculators."⁵⁸ At this time too (more precisely from 1790 to 1808) land grants in Nova Scotia were forbidden, following a period during which they had been given away. The prohibition meant little, however, and was circumvented by one means or another, most commonly by squatting.

By 1827 nearly all the land suitable for settlement had been taken up (Fig. 4). In his quest for land for emigrants, Cockburn could find little in Sydney County.⁵⁹ The whole county (now the two counties of Antigonish and Guysborough) was reported to contain 120,000 acres of "good vacant land well situated for settlement," but this was scattered in several tracts and its quality was generally over-rated. The best land for settlement as it had been in the homeland of the settlers and as it remains today in Antigonish was the flood plains and lower terraces along the main streams, especially those converging on the town of Dorchester (now Antigonish). These lands were known as "interval" (or intervalle) lands because they presented open spots or "intervals" in the forest.⁶⁰ They possessed a double advantage. They did not require clearing and they were of above average fertility. It is significant that the town of Dorchester was first known as Antigonish Interval. Further, the most common place names associated with early settlement were those of Rivers and Brooks—Lower and Upper South River, James River, West River, Brierly Brook, and others (Fig. 1).

The boundless forest was a new and strange sight to the Highlander and he must have viewed it with fear and dismay. "An emigrant set down in such a scene," wrote Selkirk of his Highland settlers on Prince Edward Island, "feels almost the helplessness of a child. He has a new set of ideas to acquire." The result was that "abandoned to their own exertions," the Highlanders rarely avoided "involving themselves in inextricable difficulties."⁶¹

But the Highlanders were hardy pioneers. They knew how to endure hardships and how to live with a minimum of comfort. They had been bred to this type of life and the forest, once cleared, proved more of a blessing than a curse. It provided the logs to build a house and material for the construction of carts and implements. On land newly cleared by fire the wood ashes provided potash for an abundant first crop. This, together with the cheapness of the land, encouraged rapid clearing, in some cases carried on to excess. The amount of cleared land per

⁵⁸ Cowan, *op. cit.*, p. 38.

⁵⁹ *House of Commons Papers*, "Report by Lt. Col. Cockburn on Emigration . . . with statistical information relative to Nova Scotia," Vol. 21 (1828), pp. 109, 148. The map accompanying the report, part of which is reproduced as Fig. 4, is more diagrammatic than cartographic, but does indicate the relative location of the settled and unsettled land.

⁶⁰ The "intervals" still stand out as a distinct feature on aerial photographs and topographic maps of the present day.

⁶¹ Selkirk, *op. cit.*, pp. 185-186.

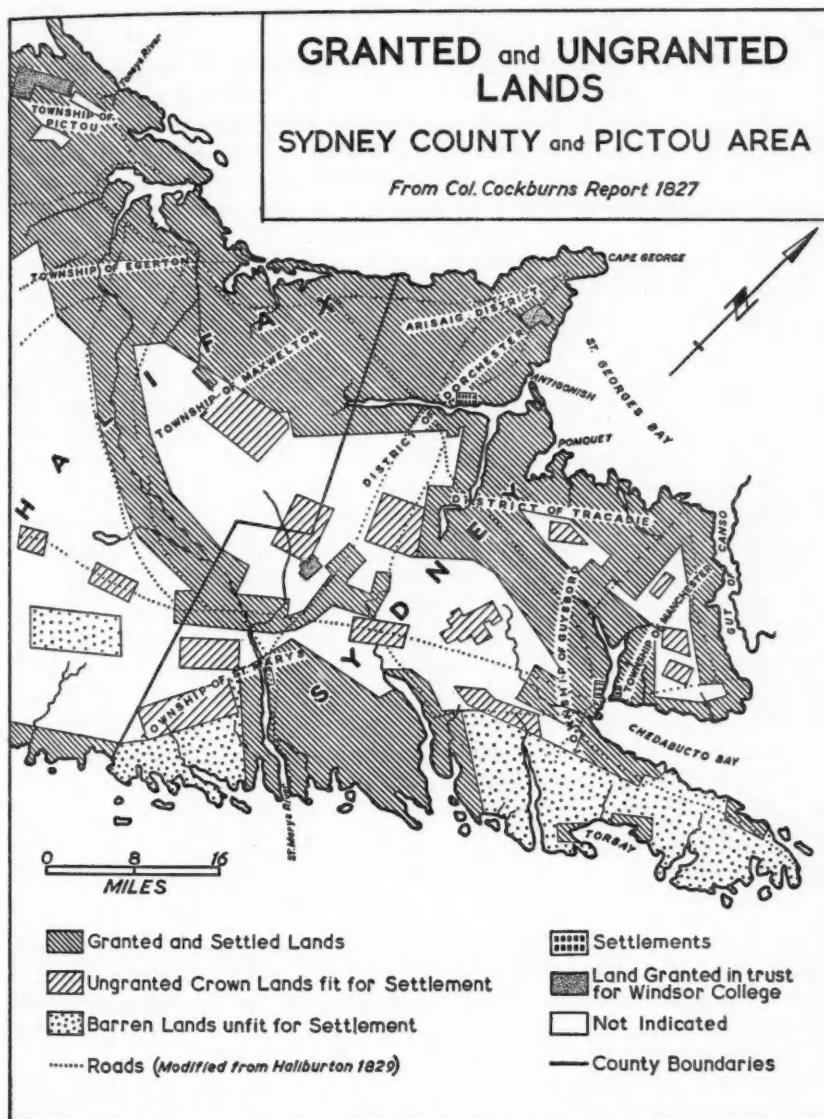


FIG. 4. Sydney County and Pictou Area, Nova Scotia. Granted and ungranted lands, 1827.

farmer in 1827 was 36.5 acres, a figure actually larger than that of improved land per farmer in 1941 and 1951 (Table I).

The timber also turned Highlanders away from the land. Between 1812 and 1819 considerable quantities of large timber were exported from the area between Antigonish and Pomquet and when this declined Antigonish continued to provide sawed lumber shingles and staves for the Halifax and Newfoundland market.⁶² But Highlanders knew little of lumber and made poor woodsmen. More often than not their earnings failed to cover expenses and in the process their lands were

TABLE I
AGRICULTURAL PRODUCTION IN ANTIGONISH COUNTY,
1827; 1881, 1891; AND 1941, 1951

Agricultural item	1827 ^a	1881, 1891 ^b	1941, 1951 ^b
Total population	7,724	17,087	11,258
Total number of farmers	883	2,622	1,294
Total acreage improved ^c	30,257	135,174	39,622
Acreage improved per farm	36.5	51.5	30.5
Production per farm:			
Wheat, bushels	19.8	12.9	4.5
Oats, bushels		54.1	116.6
Barley, ^d bushels		4.2	11.0
Potatoes, bushels	273.6	116.8	78.8
Other roots, bushels	— ^e	13.0	52.1
Hay, tons	11.9	15.0	20.4
Livestock, number per farm:			
Cattle	12.3	9.3	8.2
Horses	0.7	1.4	1.6
Sheep	20.6	10.4	12.3
Swine	6.4	1.2	1.3
Poultry	— ^e	14.0 ^f	42.0

^a Data adapted from "Statistical Return of the Upper District of the County of Sydney, 1827," *Report P.A.N.S.* (Halifax, 1939), Appendix B.

^b Data adapted from Census of Canada, averaged for the two census years.

^c For 1827 and 1881, 1891 (not 1941, 1951) includes non-tillable land used for pasture.

^d Enumerated with oats in 1827; includes mixed grain for 1941, 1951.

^e Not available.

^f Data for 1891 only.

neglected. But in the Highlands tradition, carried from Scotland to Nova Scotia and still very much in evidence in both places, farming was regarded as a last resort. If other activities were available, be they fighting or kelp manufacture in the old country or lumbering in the new, agriculture was forsaken. The failure of these activities or the lack of others forced a return to the land.

By 1827 the economy of the county revolved around the export of horses, cattle, sheep, grain, butter, and pork. The emphasis clearly was upon livestock activity, something that came much more easily to the Highlander than the cultivation of

⁶² J. W. MacDonald, "A Brief Sketch of the History of the County" (1876) in Rankin, *op. cit.*, pp. 1-46.

land. The conditions of the times—the demand for meat, especially by the armed services during and after the War of 1812 and the availability of cheap flour from the United States—promoted a livestock economy into which the Highlander could very easily fit.

Great efforts were made to discourage the emphasis on livestock that was prevalent throughout most of the province and to promote in its stead cultivation of the land and the raising of wheat. The administration of Lord Dalhousie was anxious to make the colony independent of American flour, but the feelings of some writers of the day went even deeper. John Young was one of these.⁶³ Constantly he sought to demonstrate to the new settlers that they could profitably grow wheat, that the country was adapted for something better than pasture, that grazing was a poor activity, "compatible with indolence, stupidity and a gross ignorance of all principle."⁶⁴ He could understand the emphasis on stock back in the Highlands, where excessive moisture in the summer and fall limited crop production. But here the climate was different. It was "infinitely superior . . . and could ripen productions that scarcely lived under glass in Scotland." The dry fall should have been a special inducement. "During the whole autumn from the beginning of September to that of December, we are blessed with a delightful tract of weather—the sky serene and unclouded, the roads dry—and the plough may be in perpetual motion."⁶⁵

The number of stock in the county was high, even for a pioneer land. Each farm averaged more than 12 cattle and 20 sheep (Table I), numbers which have since significantly declined. Even the number of hogs was fairly high although this was even more of a temporary situation. Again, as they had in Inverness-shire, farmers tried to keep too much stock and their means were not sufficient to keep them in good condition. Livestock numbers in the Scottish parts of the county differ very little from those in the district of Tracadie, occupied largely by Acadian French (Table II). However, considerable differences do exist in the matter of forage for the stock, notably "other grain" and hay. The Tracadie farmer had a substantially greater production in these two items. Selkirk considered that a supply of hay of one to one and one-half tons per head was a requirement to carry cattle through the year.⁶⁶ Production among the Highlanders was less than 0.9 tons per head per year; the figure for the Tracadie farmer was approximately 1.2. The Highlander had a tendency to exhaust his hay lands by repeated croppings. This initiated a cycle of diminishing returns. The need for hay meant that pasture lands, a necessity in the summer, became hay lands and in turn these too became exhausted. The disinclination to improve the soil and plow upland meant less

⁶³ John Young, *The Letters of Agricola* (Halifax, 1922; first printed, 1822). Writing under the pen name of "Agricola," John Young was Nova Scotia's first agricultural missionary, seeking to stir the province from the "lamentable state of its agriculture" by instructing and exhorting through the columns of the Halifax newspaper, *The Acadian Recorder*.

⁶⁴ *Ibid.*, p. 168.

⁶⁵ *Ibid.*, pp. 293, 318.

⁶⁶ Selkirk, *op. cit.*, p. 227.

production of feed grain, necessary to supplement hay. It also meant that the old hay lands remained unproductive.

Wheat production was fairly high by 1827⁶⁷ (Tables I and II), due in part to the promotion of the crop by the newly formed Sydney County Agricultural Society. Before the formation of the society the Dorchester area was an importer of wheat, largely from the northern coast of the county. The high production here (over 24 bushels per farm in 1827 compared to a county figure of less than 20) may have been the result of applications of seaweed for manure, a practice carried from Scotland and still significant today. By 1821 the Dorchester area was producing a small surplus and in 1822 exported in wheat and flour the equivalent of 4,000 bushels to Halifax, Pictou, Arichat, and Newfoundland. The Arisaig district continued as a strong exporter, sending out the equivalent of 1,200 bushels of wheat a year.⁶⁸

TABLE II
AGRICULTURAL PRODUCTION PER FARMER, ANTIGONISH COUNTY
AND DISTRICTS, 1827^a

Product	County	Arisaig	Dorchester	St. Andrews	Tracadie
Wheat, bushels	19.8	24.1	19.3	18.2	17.6
Other grains, bushels	34.4	30.5	36.8	26.0	44.1
Potatoes, bushels	273.6	248.9	308.0	246.3	291.0
Hay, tons	11.9	8.9	13.9	9.9	15.0
Livestock, number per farm:					
Cattle	12.3	11.2	13.6	11.4	12.8
Horses	0.7	0.7	0.5	0.9	0.7
Sheep	20.6	18.7	20.0	19.6	24.1
Swine	6.4	6.3	6.2	5.1	8.1

* Data adapted from Statistical Return, 1827.

In general the crop was produced without regard to rotation or fertilizer. Moorsom writes of as many as seven successive crops raised on the uplands of Antigonish without the aid of lime or manure.⁶⁹ One of the handicaps to agricultural improvement in Inverness had been the landlords' demands for high rent and refusal in the meantime to maintain or improve the soil which was providing that rent. The Highlander in the New World, now his own landlord, treated the land in the same way.

The production of oats began to increase in the 1820's, following the letters of Agricola and the awarding of bounties for oatmeal mills. Oats were recognized as a supplement to or even substitute for wheat and the extension of the crop was one of the objects in the Program of the Provincial Agricultural Board. The other

⁶⁷ This was a poor year for wheat. According to Haliburton, returns in some districts including nearby Pictou, were as low as one third of the average. In addition, data were lightened because of fear that they would be used for taxation purposes.

⁶⁸ From correspondence quoted in J. S. Martell, "The Achievements of Agricola and the Agricultural Societies, 1818-1825" (Halifax, 1940).

⁶⁹ W. Moorsom, *Letters from Nova Scotia* (London, 1830), p. 181.

parts of the Program, equally applicable to Antigonish, included the introduction of summer fallow as a preparation for wheat, the increased use of lime, the cultivation of turnips, and the promotion of more and better plowing.⁷⁰ There was little to criticize in the matter of potato production, except that there was possibly too great a dependence upon the crop. The average annual production per farmer in the county was over 270 bushels. In Dorchester the figure was over 300 bushels (Table I, II). Here at least was an instance where their background served the Highlanders well.

Potatoes to the contrary, Highlanders in general and Antigonish Highlanders in particular fared poorly at the hands of observers of the day. Moorsom wrote that the Antigonish settlers, "being chiefly Highland Scottish and accustomed to large sheep walks rather than to tillage farms, exhibit . . . very inferior attainments in almost every branch of agriculture."⁷¹ He is wrong about the sheep walks, but his main observation stands. Young observed that inferior crops in his area were due to "blind and wretched husbandry" and deplored the lack of barley, the "very foster child of Nova Scotia."⁷² The Rev. Thomas Trotter of the Sydney County Agricultural Society blamed the Highlanders for that organization's slow progress. "We have a very few active people," he wrote, "but the Highlanders are ignorant and Lasy [sic]."⁷³ Other observers were kinder and saw deeper. To Haliburton, Highlanders were settlers with few wants: "Their ambition is chiefly limited to the requirement of the mere necessities of life."⁷⁴ Selkirk had noted the same characteristics in many of his Highland settlers on Prince Edward Island. As soon as they were able to maintain their families, they would show no further ambition, preferring "the indulgence of their old habits of indolence to the accumulation of property by a continuance of active industry."⁷⁵

It should be remembered that the Highlanders had never been a prosperous group. Many of the immigrants at the turn of the century were largely dependent upon charity. The arrivals who landed at Pictou in 1801 were forced to move eastward because the colony could not provide for them, as it had not been able to provide for their predecessors ten years before.⁷⁶ Eastern Nova Scotia offered little inducement to settlement except that the voyage from Scotland was short and the fare low. The Scots, made penniless by demands of the voyage, were attracted too by the prospect of cheap land, in many cases to be had simply by squatting. They sought little but the means of subsistence. And this they had to do without capital, without skill, and without the benefit of instruction. They could only draw on the little knowledge brought with them across the sea. Although surrounded by difficulties, they were able in a few years to provide for their needs. With this

⁷⁰ Young, *op. cit.*, pp. 296-297.

⁷¹ *Op. cit.*, p. 182.

⁷² *Op. cit.*, p. 42.

⁷³ Martell, *The Achievements of Agricola*, p. 96.

⁷⁴ *Op. cit.*, p. 279.

⁷⁵ *Op. cit.*, p. 218.

⁷⁶ Cowan, *op. cit.*, p. 257.

they stopped struggling, much to the dismay of men like Young who tried to stir them to action. But rooted in a certain way of doing things, a way that found outlets in the economic demands of the day, they were not to be aroused by agricultural societies, pamphlets, and prizes.

THE PEAK YEARS

The peak in agricultural activity in the county is generally considered to have been reached in the decade 1881 to 1891. In terms of land occupied and farm population there definitely was a peak. From 1827 to 1881-91 the total number of farms more than tripled and improved acreage per farmer increased from 36.5 to 51.5 (Table I). There was no such peak in production. Wheat declined from 19.8 to 12.9 bushels per farmer. And this was still a time of subsistence farming, before the wheat lands of the Canadian West had been opened up. "Something is wrong," wrote MacDonald, "when a county which contains 16,512 people whose chief dependence is on the production of the soil have to pay \$70,000 for bread."⁷⁷ Oat production was up and was apparently taking the place of wheat and potatoes in the diet. Potato production shows a decrease of almost 60 percent. MacDonald comments upon potato yields in Antigonish (76 bushels per acre) compared to those in Pictou (100 bushels), and Guysborough (83 bushels). He attributes the difference to the "relative skill of the farmers," adding too that they had no real inducement to improve their agriculture. The inducement, in the form of the railway, came. But it facilitated not agricultural improvement but movement out of the county. Constant cropping, unaided by rotation or the use of fertilizer, continued as a characteristic of Antigonish farmers. "They depend entirely upon the natural power of the land," wrote MacDonald, "forgetting that thought and skill and labour are required to make the most profit out of the farms and at the same time keep them from losing their fertility."⁷⁸

The livestock industry continued as the source of income for the farmers. But marketing was becoming more and more of a problem. The trade with Newfoundland which had begun as early as 1811 was subject to extreme fluctuations. It frequently happened that cattle sold at St. John's at prices that failed to cover the cost of transportation. The inducement of this trade was another factor cited by MacDonald for the low state of agriculture in the county. Farmers continued to send droves of cattle and sheep to the Halifax markets, but here too the growing expense of transportation was a serious drawback. The difficulties were reflected in a general decrease of stock, especially sheep, on which the margin of profit was smallest (Table I). The smaller number of cattle together with the increased supply of hay and larger pasturage probably meant that the animals were better fed, but they were not fed well enough to command prices that would more than defray transportation costs.

⁷⁷ J. W. MacDonald in Rankin, *op. cit.*, p. 44.

⁷⁸ *Ibid.*, p. 45.

PRESENT CONDITIONS

The most significant agricultural change between 1881-91 and 1941-51 has been the sharp decrease in the number of farms (Table I). As in the rest of Nova Scotia, this has been the result of large-scale land abandonment, coinciding first (around 1900) with the rapid settlement of Canada's Prairie Provinces and later (after 1921) with the industrial growth of central Canada. The lure of better opportunities elsewhere, however, is only part of the explanation. Another part has been the inability of the Antigonish farmer to adjust his activities to the demands of modern commercial agriculture. It is true that a good deal of the land abandoned, while suitable for a subsistence agriculture, is not suitable, physically, for today's agriculture. It is equally true that on much of the best land, farming is not very different from what it was in 1881.

Farming still revolves around livestock, as it did in the peak and pioneer years and as it did before that in the Highlands of Inverness. However, the number of animals per farm (with the exception of poultry) has changed very little. The numbers of swine and sheep remain very low. The raising of hogs, something the Highlander regarded with aversion, has never been a very sizeable enterprise. In the 1930's the county imported young pigs from Prince Edward Island, and even today not enough hogs are raised for the local market. There is no particular prejudice against sheep. Actually they are well-adapted to conditions in eastern Nova Scotia. They are economical to house and feed and can be finished on good pasture. Too often, however, sheep (which are easy animals to manage) have been left entirely to themselves. The result has been trouble with parasites and dogs, and a poor quality lamb that tended to spoil the market. The farmers in turn have shown little interest in improving the situation, preferring instead to cut down on sheep numbers.

Even cattle, the "forte" of the Highlanders, show a slight decrease in numbers. What is more significant is that there has been a shift in the last 50 years from cattle raised chiefly for sale to cattle raised for dairy purposes. Of the 9.3 cattle per farm for the years 1881 and 1891, 3.7 were milk cows. Of the 8.2 in 1941 and 1951, 4.7 were milk cows. The shift began with the virtual disappearance of the Newfoundland market and increased competition from central Canada, made possible by refrigeration and improved transportation. It was facilitated by the efforts of Dr. Hugh MacPherson of Antigonish who introduced Ayrshire cattle, developed a breeding program and distributed young bulls to interested farmers.

Despite the change in emphasis, the livestock industry is beset with problems similar in many ways to those that handicapped previous generations. First there is a striking lack of feed crops produced. Table I indicates that the average farm in 1941 and 1951 produced only 20 tons of hay, 117 bushels of oats, 11 bushels of barley and mixed grain, 79 bushels of potatoes, and 52 bushels of other roots—a very small production on which to maintain a livestock industry. The area in cropland is small and the production from it is small. This in turn curbs the outlook and ambition of the producer. D. J. MacDonald stated the problem as one of "small

patch plots and small patch mentalities" reinforcing one another to the detriment of agriculture.⁷⁹

Contributing to low production is the condition of the soil. Throughout the county, soils of all kinds have been cropped continuously until almost no lime, phosphate, or potash has been left in them. On the basis of more than 1200 soil samples collected in the farm-to-farm surveys of the Soil Division, Nova Scotia Agricultural College (1941 to 1944), the following soil picture emerges. Available phosphate, ranked high, medium, or low for each sample, was "low" for 82 percent of the samples. Available potash was "low" for 52 percent, and the pH was "low" (below 5.7) for 78 percent. No surveys have been carried out on organic matter in the soil, but Dr. MacPherson, who for many years has run tests on soil samples for county farmers, declares that this is their most serious soil problem. The full significance of manure is not appreciated. Fields near the farm buildings receive the most manure and those farther away are neglected, a relic perhaps of the infield-outfield method of farming. Manure piles, too, are frequently left out in the open, often under the eaves of the barn where much of the nitrogen is lost.

Another factor in low production has been the general neglect of pasture lands. The first grazing areas in the county were the woods. An extensive system of common pasturage followed with cattle, sheep, horses, and hogs ranging the partially-cleared lands and the uncleared hills and uplands. As the hay crop improved, pasture became incidental. Land too poor to grow grain and meadows too badly "run out" to grow good hay were given over to pasture. Permanent pasture was (it still is) the last use to which land was put before it reverted to timber. And its deterioration was hastened by the practice of applying the barnyard manure almost exclusively to the arable land. This meant that there was a slow transfer of fertility from pasture areas to cropland. The number of acres of pasture (improved and unimproved) per animal unit in 1941 was 4.5,⁸⁰ a high number indicating large areas of unproductive pasture.

One of the most characteristic features of agriculture and one that contributed significantly to low production is part-time farming. Of the 1,164 farms in 1951, only 292 reported sales of farm products of over \$1200. Six-hundred-eighty operators reported doing some work off the farm, 443 for more than 50 days. In some areas work off the farm is more than a supplement to farm activity; it is a replacement. An example is the St. Andrew's subdivision, an old established farm district settled almost entirely by Highland Scots. The area has clung to the "old type" of farming, the raising of mixed herds for both beef and cream. The common practice is to keep a few cows for cream and then kill a few steers in the fall. In the post-war years the demand for this beef product was high because of the general shortage of Western beef. At best this was a temporary situation. Most of the farms also regularly sell lambs and wool. This mixture of "livestock and

⁷⁹ Report of the Royal Commission, Provincial Economic Enquiry, J. H. Jones, Chairman (Halifax, 1934), p. 163.

⁸⁰ Census of Canada, 1941. Figures for unimproved pasture not available for 1951.

dairying" has the advantage of not demanding a great deal of work from the operator. It frees him to look for a part-time job in road work, construction, or whatever else may be available.

Low production is not confined to part-time farms or to those which ship cream for their main source of income. Even the most prosperous farms, those which ship whole milk to Antigonish or to Sydney, are low producers. They are characterized by a low improved acreage, a small dairy herd, extensive crop operations, a low capital investment, and poor pastures. The number of acres in improved land is seldom above 40, and the herds average about ten cows in milk. The farm unit specializing in milk production is usually dependent upon large purchases of feed.

Low production is not peculiar to Antigonish County nor to eastern Nova Scotia. Throughout the whole province agriculture is hindered by its small farms, small herds, and extensive utilization—items inherited from a past when farming provided only necessities and it seemed more important that it be associated, where possible, with other activities that were more profitable. The background of the Antigonish settler enabled him to fit readily into this situation. After a few years of clearing lands and getting accustomed to his New World environment, he needed to make only a minimum further adjustment. His livelihood continued to center around cattle, and these continued to be underfed because of poor pasture and small feed production. He brought with him an understanding of potato cultivation because it had been his main food. As the significance of the crop for food in his new home decreased, its production fell off. Here he owned his land and could improve it as he chose, but he treated it little differently than had his absentee landlord across the sea. There were no labor conflicts here because of demands of landlords, but a minimum of time was devoted to farm work, in the eyes of the Highlander a menial task to be forsaken whenever other employment was available. And when the opportunity came to migrate to other parts of Canada and the United States, farmers left in large numbers in a stream that has had little let-up since 1891.

Old ideas and practices have persisted to a much greater degree in this section of the province than elsewhere because of its settlement background and because of its relative isolation—factors stressed by MacDonald in his submission to the Jones Commission:

"Scientific agriculture in this country is moving eastward and since we are on the fringe we have been the last to be affected by it. Our culture has not been subjected to it as have been the western parts of the province. Many of our farmers know little or nothing about it. Many are not devoting the various kinds of soils found on their farms to the production of the things for which they are most economically suited. The remedy for this . . . is agricultural education."⁸¹

The remedy remains and there have been some signs of concrete results in the last 15 years. The most notable has been the increased use of lime, a prime need

⁸¹ Report of the Royal Commission, *op. cit.*, p. 164.

of the county's acid soils. With effective promotion by the provincial Department of Agriculture and the Extension Department of St. Francis Xavier University, the total lime used in the county increased from 2,850 tons in 1940 to 5,001 tons in 1947. This accomplishment, by itself, is not a great one. It assumes significance when viewed against the agricultural background of the county. It points up the obstacles that remain. Antigonish is in the process only now of making some definite adjustment to the demands of commercial agriculture. How the adjustment is made will depend upon how resistant the obstacles prove. They have deep roots. They go back to the 18th century, to the straths and uplands of Strathglass, Lochaber, and the west Highlands and islands of Inverness-shire.

DURUM WHEAT AND THE EXPANSION OF DRY FARMING IN THE SOVIET UNION*

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DURUM wheat (*tverdaia pshenitsa*)¹ is a critical indicator of the expansion and stability of dry farming in the USSR. Because of its characteristics, it is ideally suited to spearhead the advance of wheat culture in the southern steppe, a fact to which recurring directives of both the Communist Party and the Soviet government have paid tribute.² Yet in spite of the interest evinced in expanding the acreage under durum, the downward trend in production which became apparent in the 1920's has not been reversed, at least not until the present. The program instituted in the spring of 1954, to put under cultivation some 70 million acres of virgin and idle land³ may alter the situation somewhat, and for this reason the gigantic project takes on added significance. However, while the downward trend may be brought to a halt, a long-run improvement in the durum wheat acreage in the USSR, as this paper will attempt to show, will depend on a widespread advance in agricultural methods, which do not appear to be broadly contemplated.

The chief region of durum wheat production in the Soviet Union has traditionally been along the southern margin of the spring wheat belt⁴ (Fig. 1). Durum, adapted to soils rich in nitrogen, tolerant of alkalinity though not of strongly solonetz soils, and rust resistant, invariably tends to give best results in a hot,

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¹ The species *Triticum Durum* was established in 1798 by R. Desfontaines for the group of wheats having long awns (bearded) and long vitreous kernels, the latter being very hard, often large and frequently yellowish-white in color. The durum wheats, high in protein content, produce the best semolina and in the United States they are often called macaroni wheats. In Europe and in the Soviet Union, they are called hard wheats and are used in the manufacture of both macaroni and bread. Russian experience has long shown that durum wheat upon milling forms a bread flour superior to that of most other wheats grown: the bread is richer to the taste and remains fresh much longer than bread made from other wheats, so visitors to Tsarist Russia have testified. See: Mark A. Carleton, "Macaroni Wheats," U.S. Dept. of Agric., Bureau of Plant Industry, *Bulletin No. 3*, 1901, pp. 44-45; I. V. Iakushkin, *Rastenievodstvo* (Moscow, 1947), p. 94; Lazar Volin, "A Survey of Soviet Russian Agriculture," U.S. Dept. of Agric., *Agriculture Monograph 5*, 1951, p. 119.

² A. V. Navolotskii, "Kul'tura tverdoi pshenitsy v SSSR i ee znachenie v podniatiu urozhainosti," *Selektsiya i Semenovodstvo*, 1936, No. 6, pp. 6-16; Ia. Dubovik and Sh. Imranov, "Tverdie pshenitsy v severnom Kazakhstane," *Zemledelie*, 1954, No. 6, pp. 78-81; M. M. Samsonov, "O proizvodstve vysokokochestvennykh pshenits," *Zemledelie*, 1955, No. 2, pp. 89-91.

³ W. A. Douglas Jackson, "The Virgin and Idle Lands of Western Siberia and Northern Kazakhstan: A Geographical Appraisal," *The Geographical Review*, January 1956, pp. 1-19.

⁴ A limited amount of durum is sown in the fall in the Trans-Caucasus and in Dagestan ASSR, in the North Caucasus, but in general almost all varieties are best adapted for spring sowing.

dry climate. In humid conditions it is usually susceptible to blight and other diseases.⁵ Hence, durum's northernmost extent historically has been described as marching closely with the northern edge of the steppe, or the northern limit of the chernozem.⁶ Such a generalization, however, overlooks the fact that little durum is grown, for various reasons, in the western Ukraine or in the Central Black Earth Belt, while east of the Volga, and particularly east of the Urals, it has been found under cultivation in the forest steppe and even in the river valleys of the southern taiga.⁷

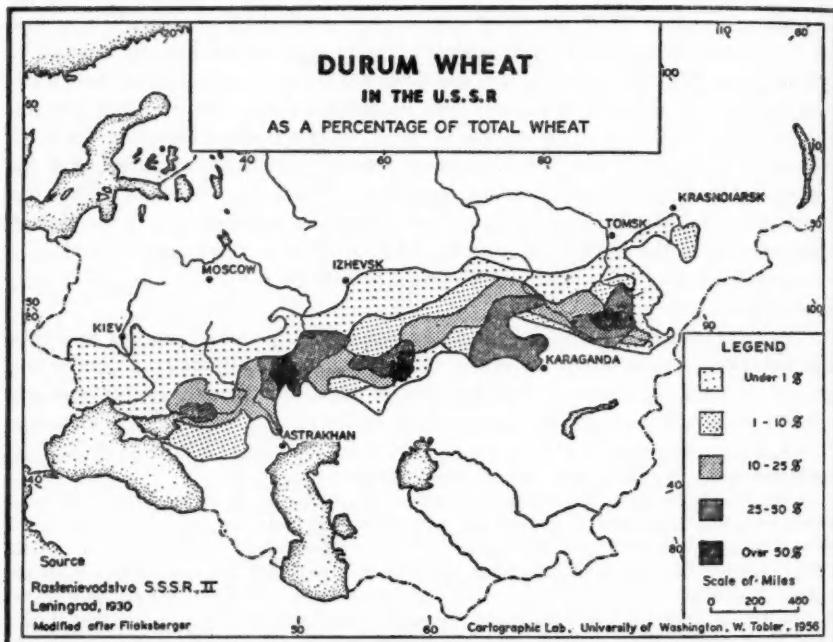


FIG. 1. In the early 1930's the sowing of durum wheat was concentrated primarily in at least four distinct regions: about the lower Don, along the middle Volga, in the southern Urals, and in Altai Krai. In what is now north-central Kazakhstan, durum wheat was also relatively important.

⁵ Iakushkin, *op. cit.*, p. 97; Carl L. Alsberg, "Durum Wheats and Their Utilization," *Wheat Studies of the Food Research Institute*, Vol. XV, No. 7 (April, 1939), pp. 342-344.

⁶ K. A. Fliaksberger, "Pshenitsy Rossii," *Materiali dlia izuchenii estestvennykh proizvoditel'nykh sil' Rossii*, No. 17, Petrograd, 1917, p. 23; *Pshenitsy* (Moscow and Leningrad, 1935), pp. 166-169.

⁷ Durum will grow in the western Ukraine but, since that region is well-suited for fall-sown wheat, the acreage sown in spring of either durum or common wheat is small. In the Central Black Earth Belt, both spring frosts and the Swedish fly as well as a possible early spring drought hinder the growing of spring wheat; in addition, durum is susceptible there

During the 19th century, durum wheat accompanied settlers into the fertile but semi-arid steppe north of the Caucasus and into western Siberia, revealing itself as a pioneer crop par excellence.⁸ At the turn of the century, it was widely sown from the Black Sea to the Altai Mountains, as well as in the Minusinsk Basin to the east. Much of the crop from the territory west of the Volga was exported annually via Taganrog on the Azov Sea to Italy and France; east of the Volga durum was grown for domestic consumption.

Prior to 1914, Russia led the world in the production of durum wheat, harvesting ordinarily about 150 to 200 million bushels annually. Though world pre-eminence was retained after the revolution, both acreage and production underwent a decline, especially east of the Urals. Where durum was formerly predominant in many districts throughout the western Siberian steppe, only in Rubstov and Slavgorod *raions* in the Altai region did durum in the 1920's continue to exceed significantly common spring wheat in acreage.⁹ Yet, by 1927, even in Slavgorod *raion* acreage was contracting.¹⁰ In the mid-1930's the creation of new grain sovkhozes in western Siberia and northern Kazakhstan brought a temporary increase in the durum area.¹¹ But the downward trend was resumed with the abandonment or conversion of the grain farms. In Kustanai *oblast* in 1939, durum accounted for 13.1 percent of the spring wheat acreage (about 128,000 acres), but by 1952 it constituted not more than 4.1 percent.¹² In Kokchetav *oblast* the decline was even more striking—from 30.7 percent in 1940 to 3.2 percent in 1953. The situation was comparable in other oblasts in northern Kazakhstan.¹³ Indeed, in 1951 as much durum could be found in Saratov *oblast* alone (where it occupied

to the fungus *Fusarium*, though in recent years some expansion of the durum acreage has occurred. (The *Fusarium*-blight causes (a) the dying off or weakening of young seedlings, (b) the dying or wilting of fully grown plants, and (c) the blighting of the heads, wholly or in part, thus preventing them from filling. D. Atanasoff, "Fusarium-Blight (Scab) of Wheat and other Cereals," *Journal of Agricultural Research*, Vol. XX, No. 1 (Oct., 1920), pp. 1-32.) East of the Volga, the growing of durum in the forest steppe may be facilitated by lower atmospheric humidity, thus illustrating the principle that the ripening of durum is promoted in a dry air and a humid soil, but is retarded in a humid air and a dry soil. (Carleton, *op. cit.*, p. 16).

⁸ N. Jasny, "Der Russische Weizen," *Zeitschrift für Wissenschaftliche Landwirtschaft*, LXIII, Heft 3 (1926), pp. 411-461.

⁹ S. D. Grebennikov, *Iarovaia Pshenitsa v Sibiri* (Novosibirsk, 1949), p. 43.

¹⁰ K. A. Fliaksberger, *Raiony vozdelivaniia tverdoi iarovoi pshenitsy v SSSR* in *Rastenievodstvo SSSR* (Vzeyoznuznaia Akademii Sel'skokhoziaistvennykh Nauk Imeni Lenina, Leningrad, 1930), p. 38.

¹¹ *Sel'skokhoziaistvennaia entsiklopediia* (2nd ed., 4 vols.; Moscow and Leningrad, 1937-1940), Vol. 3, 1938, p. 510.

¹² Dubovik and Imranov, *op. cit.*, p. 78; A. D. Daulbaev, "O zadachakh nauchnoissledovatel'skikh uchrezhdenii v sviazi s osvoeniem tselinnykh zemel' v Kazakhstane," *Zemledelie*, 1954, No. 7, p. 105.

¹³ A possible exception may be Aktiubinsk *oblast* which in 1953 had 45 percent of its wheat as durum, an acreage which was four times larger than in 1940. N. V. Tsitsin, "Zernovoe Khoziaistvo—osnova vsego sel'skokhoziaistvennogo proizvodstva SSSR," *Dostizheniya Nauki i Peredovogo Opyta v Sel'skom Khoziaistve*, 1954, No. 7, p. 12.

over 1.2 million acres, approximately 51 percent of the oblast's spring wheat) as in all the northern oblasts of Kazakhstan.¹⁴

On the whole, during the period between the World Wars, the area under durum wheat fell from about 15–17 million acres (or 28 percent of all spring wheat) to less than 11 million acres (or approximately 17 percent) (Table I). In 1951, durum wheat was sown on probably less than 10 million acres.¹⁵

Both Tsarist and Soviet Russian experience with growing durum wheat in the semiarid steppe, on chernozem and chestnut-brown soils, has revealed that the best results are obtained *only* when durum is sown on freshly-ploughed grasslands.¹⁶ When sown consecutively for a number of years on the same land, yields fall off significantly. As the soil becomes bereft of humus (and moisture) and structure is weakened, the durum grains show the effect plainly by becoming very hard.¹⁷ Simultaneously the grains become more opaque and white,

TABLE I
DURUM WHEAT IN THE SOVIET UNION
(IN MILLIONS OF ACRES)

	Acres
<i>Year:</i>	
1920's–1930's ^a	15.0–17.0
1939 ^b	11.4
1940 ^c	10.8
1951 ^d	10.0 (est.)
<i>Main areas of concentration^d (1951):</i>	
Middle Povolzh'e (Volga) and Rostov Oblast	5.6
Kazakhstan	1.2
Ukraine	0.7

a. Iakushkin, *op. cit.* (see text fn. 1), p. 94.

b. P. K. Ivanov, *Iarovaia Pshenitsa* (Moscow, 1949), p. 23.

c. A. I. Smirnov, *Rastenievodstvo* (Moscow, 1947), p. 85.

d. Nalivkin, *op. cit.* (see text fn. 14), pp. 7, 69.

reflecting a preponderance of starch. In short, the protein content decreases and the fine bread-making qualities are lessened. Not only that but, more important perhaps, the return per acre in bushels remains less than that of common wheats.

Grown on the periphery of wheat culture in Russia, durum "pioneered" the virgin territory as the frontier of dry farming was pushed deeper into the steppe.¹⁸

¹⁴ A. A. Nalivkin, *Tverdie Pshenitsy* (Moscow, 1953), p. 15. In contrast to the expansion of durum wheat in Saratov oblast, a decline occurred in other Volga oblasts, notably Kuibyshev.

¹⁵ In the United States in 1950, durum wheat occupied 2.9 million acres, yielding 38 million bushels (in North and South Dakota and in Minnesota); in Canada, sowings totaled 870,000 acres, producing 13 million bushels (in Saskatchewan, Manitoba, and Alberta). *Agricultural Statistics, 1953*, U.S. Dept. of Agric., Washington, 1953, pp. 2–5, and *Ninth Census of Canada, 1951*, Vol. VI, Agriculture, Part II, Dominion Bureau of Statistics, Department of Trade and Commerce, Ottawa, 1953.

¹⁶ P. N. Konstantinov, "K voprosu o kul'ture tverdykh pshenits," *Puti Sel'skogo Khoziaistva*, 1929, No. 8, pp. 67–89. This is especially true in the Povolzh'e and to the east.

¹⁷ Carleton, *op. cit.*, p. 47.

¹⁸ Alsberg, *loc. cit.*; Navolotskii, *op. cit.*, p. 7; B. S. Emanuel' and V. I. Seletskii, "Iarovaia pshenitsa v Stavropol'e," *Sovietskaia Agronomiia*, 1946, No. 7, pp. 84–85; V. M. Obukhov, *Crop Productivity and Meteorological Factors* (Moscow, 1949), p. 47. English translation.

In older areas of cultivation, as a result of declining yields due to constant cropping, it was gradually replaced by common wheat. After World War I, as the more readily cultivable virgin grasslands receded from view, there no longer existed the means for sustaining and increasing harvests of durum. Apart from the abortive assault on the Kazakh steppe in the mid-1930's, no other major attempt was made to assimilate virgin lands, while in older areas of cultivation little success was achieved in establishing techniques which might foster a significant increase in durum production. Thus, the decline, once under way, had little to offset it.

In the Soviet Union, after the ploughing of the dry grassland durum wheat should be grown in successive seasons only for two or three years; after that must come a shift to the *perelog* system. The principle was laid down by leading Soviet agricultural specialists after experience both in the field and in the experiment station.¹⁹ Under the *perelog* method, the land is permitted to lie idle or fallow and revert to its natural state for a period upwards of two years depending on the soils, in order to improve soil structure and moisture content. Implied, therefore, is considerably less than one crop in two years.²⁰ But, there is evidence to suggest that the technique has not been effectively adopted in the growing of durum wheat and the land, on the contrary, is in production year after year.²¹ Consequently, the fertility of long-exploited land is low, while a large part of the arable area remains unnecessarily idle for too long a period. Much of the area currently being ploughed throughout the steppe represents such long-fallow land; in initial years it should yield reasonably well given normal moisture. Yet, over the long run, the Soviets must avoid almost constant cultivation of the land on the one hand and the long withdrawal of arable land from cropping on the other.

Additional light is shed on the problem in an article written by M. A. Govar in a recent issue of the *Bulletin* of the Academy of Sciences of the Kazakh SSR.²² He states that the 15 million acres of virgin and idle land ploughed in northern Kazakhstan in 1955 should be ideally suited for durum wheat (and millet), but that in 1956 its suitability would be somewhat reduced. In 1957, therefore, the land should be sown only to common wheat and grain forage crops. Then the question is raised concerning the use of land in the following year. Should it lie fallow or be sown a fourth year to grains? If sown, yields will undoubtedly be low; if fallowed, then grain must be sown on new land (if overall production is to be maintained). Govar recommends that, in order to carry out a proper crop rotation and retain high yields, additional land must be ploughed

¹⁹ Konstantinov, *loc. cit.*

²⁰ P. I. Koloskov, *Agroklimaticheskoe raionirovaniye Kazakhstana*, Vol. 1 (Akademii Nauk Soiuza SSSR, Institut Geografii, Moscow, 1947), pp. 232-234; I. S. Suleimenov, "Pshe-nitsa v Kazakhskoi SSR," *Sovietskaia Agronomiia*, 1947, No. 2, p. 22; N. Jasny, *The Socialized Agriculture of the USSR* (Stanford, Cal.: Stanford University Press, 1949), p. 120.

²¹ Koloskov, *loc. cit.* See Jackson, *op. cit.*, p. 18.

²² M. A. Govar, "O poriadke osvoenii tselinykh i zaleznykh semel' i ukreplenii kor-movoii basy zhivotnovodstva v severnykh i zapadnykh oblastiakh Kazakhstana," *Vestnik Akademii Nauk Kazakhskoi SSR*, 1954, No. 4, pp. 3-13.

from 2 to 2.5 times that sown to wheat and other grains in 1955. Govar's system indicates that in any year scarcely more than 50 percent of the land would be in grains, the rest being idle or sown to non-grain crops. The author suggests, too, that after grains the land be sown to perennial grasses in order to strengthen the livestock industry.

The continued stress placed in the Soviet Union on the importance of ploughing virgin and idle lands thus begins to take on added significance. Not only do such efforts represent a desire to expand the wheat area in general, but to do so through increasing the sowing of durum wheat whose adaptability to conditions in the droughty steppe is well known. Such, in brief, was the goal of the Decision of the Sovnarkom²³ and the Party of April 20, 1940; of the February Plenary Session of the Central Committee of the Communist Party of 1947;²⁴ as well as of the February-March and September Plenums of 1954.²⁵

The emphasis placed in the Soviet Union on the need for expanding the acreage under durum wheat is adequate testimonial to the latter's importance in the wheat economy of that country. Yet, in reality, the sowing of durum has undergone a downward trend that has become particularly striking since the early 1930's. The reasons for this are, in a sense, twofold. There no longer remained, in the semiarid steppe, soils which could readily be brought under cultivation, with the result that the speed with which virgin lands were ploughed fell below that of the Tsarist period. Secondly, in older regions of cultivation in the steppe, there was no systematic application of *perelog* methods to insure the maintenance of soil fertility; thus it became more desirable to grow common wheat than durum.

In the attempt to expand wheat production in general, and in the light of the apparent urgency compelling the Soviets to a rapid increase within a short time, there is danger that expediency may force the abandonment of the proper techniques.²⁶ Instead of creating a large granary, the Soviets may well be nurturing a vast dust bowl.

The ploughing of virgin and idle lands could bring a temporary halt to the decline in durum wheat acreage and production since durum, because of its greater tolerance than common wheat of conditions in the southern steppe, is in a position to guarantee some success to Soviet efforts. But, in the long run, a significant improvement in the quality of Russian wheat demands that growing techniques be improved and in the sowing of durum wheat this implies the enforcement of the *perelog* system of cropping.

²³ Soviet Narodnykh Komissarov (The Council of People's Commissars).

²⁴ A. I. Smirnov, *Rastenievodstvo* (4th ed.; Moscow, 1947), p. 81.

²⁵ Tsitsin, *loc. cit.*

²⁶ Dean Lambert, who visited the Soviet Union in 1955, reports that the Russians intend to fallow only two years in ten. *Nebraska Experiment Station Quarterly*, Vol. 10, No. 2 (Fall 1955), p. 7. See also: H. Plambeck, "Land Use in Russia," *Journal of Soil and Water Conservation*, Vol. 11, No. 2 (March 1956), p. 61.

CHANGING SIGNIFICANCE OF ENVIRONMENTAL FACTORS AT BLOOMINGTON, INDIANA

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C OMPARATIVELY little on the changes with time in the significance of local geographic factors has been reported in geographic literature. One consequence has been a wide difference of opinion among geographers and others as to the significance of geographic factors. Bloomington, Indiana, affords an instructive case-study of such changes and the need for repeated re-evaluation as man's technology evolves and as other areas develop. This city is selected because for 37 years it has been the subject of study by me (commencing four years after receiving the Ph. D. at Chicago). Little that is directly geographic has been published on it, except on its climate and limestone industry.¹

Here are discussed the changing significance of Bloomington's location in the state, of its rolling topography, of its site on a drainage divide in a depression between more rugged land, of its being underlain by an exceptional limestone, and of its situation in a wooded, unglaciated area. Considered also are its accessibility, the quality of the soil, the feasibility of dams to create reservoirs, and its attractiveness as a residence city.

Bloomington was established where it is largely because of the selection of the site for the "Seminary township". In the enabling act that created Indiana the federal government provided for a donation of a township of public land in support of an institution of higher learning.² The seminary established in that township in 1824 has grown into Indiana University. The committee appointed to select the township made its recommendation in time for President Monroe to designate it on July 10, 1816.³ The county created two years later surrounding it was named after President Monroe. The township later was named after Commodore Perry.

The selected township was near the northern margin of the part of Indiana which had been surveyed in 1812 into sections and townships. Nearly all central and northern Indiana remained Indian territory until 1818 when "The New Purchase" was made of much of that region. { The selected township was nearly midway between the northern parts of the lower Wabash Valley at the southwest and the Whitewater Valley at the southeast. In July 1816 most of the people of Indiana lived in or near those valleys, south from near Terre Haute and Richmond, respec-

¹ S. S. Visher, "The Indiana Oolitic Limestone Industry," *Economic Geography*, Vol. 7 (1931), pp. 50-58, and "Climate of Bloomington," Chapter 26 of *Climate of Indiana* (Bloomington: Indiana University, 1944).

² David D. Banta, "History of Indiana University," in *Centennial Memorial Volume* (Indiana University, 1921), pp. 11, 12. Judge Banta was dean of the Indiana University Law School, 1889-96.

³ *Ibid.*, p. 12.

tively, or along the Ohio River at the south,^{5,6} partly because those rivers were then the chief highways of travel.⁷ The township is about 20 miles west of the middle longitude of Indiana. Southcentral Indiana is mostly rather rugged partly because it was not glaciated.⁸ However, in the midst of this generally hilly region is a broad shallow depression or valley, the so-called Limestone Belt, which extends from near Louisville, Ky., north-northwestward to beyond Bloomington.⁹ This Limestone Belt is generally well drained and has many large springs, fed by underground streams, the most famous of which is Lost River, which emerges near French Lick.

The township selected then had no settlers, while more southern townships already had at least a few, and hence were not all federal land.¹⁰

Promptly after the township was set aside in support of a state institution of higher learning, Bloomington was started just north thereof.¹¹ Although the actual site of the "seminary" was not legally determined until 1820,¹² its probable location was evident in 1816 when Bloomington's first settlers came, because the most favorable site in the designated township was by a large spring in a valley believed not to be subject to flooding, a quarter mile from the center of Bloomington. Monroe County was organized early in 1818, with Bloomington as its county seat.¹³ The town was plotted in April 1818, and the first lots were sold by auction, some of them at the surprisingly high price of \$200 a lot. The prospectus of the auction, published in newspapers of Vincennes, Louisville, and Cincinnati, listed among the advantages of the townsite that it was healthful as it was not subject to flood, that it had many fine springs, that the soil was fertile, and that it was at the head of navigation on Clear Creek down which flatboats could descend via Salt Creek, and the White, Wabash, Ohio, and Mississippi rivers.¹⁴ Bloomington was established on the northern margin of the "Seminary township" because on the other margins

⁴ John D. Barnhart and Donald F. Carmony, *Indiana from Frontier to Industrial Commonwealth* (New York: Lewis Historical Co., Inc., 1954), Vol. I, p. 164.

⁵ Harlow Lindley (ed.), *Indiana as seen by early travellers; a collection of reprints from books of travel, letters and diaries prior to 1830* (Indianapolis: Indiana Historical Collections, 1916).

⁶ C. A. Malott, "Physiography," pt. 2 of *Handbook of Indiana Geology* (Indianapolis: Indiana Department of Conservation, 1922), p. 66.

⁷ S. S. Visher, *Economic Geography of Indiana* (New York: D. Appleton Co., 1923) pp. 15, 16, and "Regionalization of Indiana," *Annals, Association of American Geographers*, Vol. 38 (1948), pp. 282-300, reference on pp. 282-286.

⁸ Weston Goodspeed, "Monroe County," 294 pp. of Chas. Blanchard (ed.), *Counties of Morgan, Monroe and Brown, Indiana* (Chicago: F. A. Battey & Co., 1884); and Banta, *op. cit.*, p. 14.

⁹ Goodspeed, *op. cit.*, pp. 453-455; Banta, *op. cit.*, p. 14; also *History of Lawrence and Monroe Counties, Indiana* (author not mentioned; Indianapolis: B. F. Bowen & Co., Inc., 1914), p. 369.

¹⁰ Banta, *op. cit.*, p. 18.

¹¹ George Pence and N. C. Armstrong, *Indiana Boundaries, Territorial, State and County*, (Indianapolis: Indiana Historical Bureau, 1933), pp. 600-607; Goodspeed, *op. cit.*, p. 374.

¹² Bowen, *op. cit.*, p. 369.

the land is distinctly more rugged. Another advantage of the site in the flatboat era was that five miles north is Bean Blossom Creek which flows into the West Fork of the White River, affording additional flatboat possibilities. Indeed, during several early years, as many as a dozen flatboats which were loaded on Bean Blossom Creek near Bloomington descended to the Wabash, Ohio, and Mississippi rivers.¹³

Hence, at first locational factors were of prime significance. Soon, however, Bloomington ceased to be near the center of the state's population, which center has moved farther away each decade, stimulated at first by the establishment of the state capital at Indianapolis near the center of the state in 1825, and the construction of the National Road from Richmond to Terre Haute soon thereafter. Important also was the conspicuous increase in the usefulness of central Indiana, much of which had been of little value because of poor drainage.¹⁴ Also, Bloomington's situation as to navigation became much less significant as roads were constructed and became unimportant when railways appeared. Bloomington's location in the shallow depression of the Limestone Belt became increasingly significant as settlers came by the thousands along this route from Kentucky, the Carolinas, and elsewhere. After a railway was constructed from Louisville to the northern end of the Belt in 1853 and thence to Chicago in 1854,¹⁵ many people traveled this route. But later, after railways became numerous, and good roads were constructed in many parts of the state, the transportational significance of the Limestone Belt declined. At present no national road follows it, nor is it followed by an airplane route, and only locally by a pipeline. Thus a belt which for a few decades had been exceptionally favorable for transportation because of its less than average ruggedness and its possession of few streams which were difficult to cross, the latter due largely to the underground drainage in the soluble limestone, became far less significant.

Bloomington's location on a drainage divide had distinct advantages in early years partly because divides are little subject to floods even in southern Indiana with its many flood-causing rains. Divides were favored sites for early roads also because they entail fewer stream-crossings, which were difficult before there were bridges or ferries. An early road followed the divide near Bloomington, as does the town's second railway.¹⁶ Situation on the divide long facilitated storm-water drainage and sewage disposal, but when the city expanded onto the north slope, much sewage had to be pumped over the divide before it could flow to the city's sewage disposal plant. Location on the divide also became a handicap when Bloomington's water supply had to be pumped from reservoirs located at a notably lower altitude (about 220 feet).

¹³ Bowen, *op. cit.*, p. 401.

¹⁴ Lindley, *op. cit.*; John Scott, *Indiana Gazetteer* (Centerville, Indiana, 1826, 3rd ed.; Indianapolis, 1851); S. S. Visher, "Regionalization of Indiana," *op. cit.*

¹⁵ Thomas Carter Peering, in Bowen, *op. cit.*, cited in note 9, p. 448.

¹⁶ The Illinois Central Railroad was built through Bloomington in 1906. Perring, *op. cit.*, p. 453.

The forest which originally occupied the Bloomington area retarded its development because laborious land-clearing was necessary before crops could be grown, and Bloomington long depended primarily upon agriculture. Some of the trees removed were useful for fuel, building materials, or fencing, but most of them had so little value in the early years that they were burned. During the second half-century of Bloomington's history, however, much furniture was manufactured largely from local supplies of hardwoods. For several years in the 1920's a Bloomington furniture factory was reputed to be the largest in the nation. It then sold most of its output to Sears, Roebuck and Co. When local supplies of suitable lumber were nearly depleted, by 1930, the increasing costs associated with importing lumber contributed to a sharp decline in the local furniture industry.

The soils of the Bloomington area generally were productive when first farmed, but in this rather hilly, unglaciated area, most upland soils soon deteriorate sharply, partly because even during the cooler months torrential rains often fall.¹⁷ In recent decades little of the upland has been farmed; much is pastured or abandoned to brush. Hence local crop-growing has contributed relatively little to the support of Bloomington, possibly less than five percent. The decline in local agriculture reflects also the great increase in agricultural production in other areas, for example, in relatively level central Indiana, in the prairies, and the Great Plains.

The limestone upon which Bloomington rests was little used during the town's first half century, but soon thereafter it became significant. This followed the discovery of methods which take advantage of the relative ease whereby it can be sawed and grooved. Important also was the availability of large amounts of stone of uniform quality. From about 1900 to 1933 limestone played a highly significant role, as then the Bloomington-Bedford area was the world's largest producer of cut building stone. In recent years, however, the stone industry has declined as a result of increased competition of artificial substitutes, increased labor and transportation costs, and partial depletion. Whereas around 1925 perhaps a fifth of Bloomington's income flowed from stone quarries and mills, in recent years less than five percent has come thence.¹⁸

Bloomington's location on soluble limestone has played a significant role but a varying one. Among the assets stressed by promoters during the early years were the numerous springs; but as the area became settled, the springs fed by rain which entered sinkholes at higher levels became contaminated, and for decades Bloomington had a relatively high death rate from typhoid.¹⁹ Moreover, because of the cavernous limestone, no safe water was obtainable from wells.

Furthermore, leaks soon developed after dams were constructed. The city

¹⁷ S. S. Visher, *Climate of Indiana*, op. cit., esp. pp. 215-53, 466-467.

¹⁸ Joseph A. Batchelor, *Economic History of the Indiana Oolitic Limestone Industry* (Indiana University School of Business, 1944), p. 388.

¹⁹ S. S. Visher, "Geographic Variations in Death Rates in Indiana," *Proceedings, Indiana Academy of Science*, Vol. 33 (1925), pp. 55-61; Vol. 34 (1926), pp. 154-156; Vol. 44 (1934), pp. 168-173.

erected a series of dams at increasing distances southwest in 1894, 1907, 1909, and 1915, each to take advantage of a large spring and a small natural lake. But the reservoir soon leaked when the increased water pressure cleared the accumulated mud from some solution opening in the cavernous limestone.²⁰ The water famine became severe enough in especially dry seasons to induce state-wide consideration of moving the university to another city.²¹ Moreover, the only industries which could prosper were those that required little water, notably furniture manufacture, basket-making, quarrying and stone cutting, and recently the manufacture of radio and electronic equipment.

Fortunately for Bloomington, the Limestone Belt's eastern margin is only a short distance east of the city, and reservoirs constructed in the shale beyond the limestone do not leak. The first reservoir there was built by the university in 1910. The city constructed a sizable reservoir nearby in 1924, and notably increased the dam's height in 1940. In 1953 a dam located a dozen miles northeast across Bean Blossom Creek formed a reservoir large enough to supply the city's need for a long time.

Bloomington's attractiveness for residence has also fluctuated. In early years, its being well-drained made it considerably more attractive than most of the state, a large share of which was poorly-drained and rendered unhealthful partly by malaria and partly by a common herb in wet land, the water hemlock or white snakeroot which caused many deaths by poisoning the milk of cows which ate it.²² Later, after extensive ditch and tile drainage, the virtual extermination of malaria, and the building of many bridges, the level land of central Indiana and elsewhere increased greatly in value and attractiveness for residence, while sloping land deteriorated as a result of soil erosion. Hence, until relatively recently, the fact that Bloomington is in a rolling-to-rugged area was increasingly unfavorable.

Recently, however, Bloomington's site has been rendered increasingly attractive for residence by three developments, first by the great growth of the University,^① which for many years was tiny but recently has attracted many thousands of students and numerous faculty members and others. The money brought into Bloomington annually now as a result of the University is many times as much as from all other sources combined except its two largest industries. Its largest industry, electronics, grew up because its talented founder (an immigrant) heartily appreciated Bloomington's recreational and educational opportunities. He was also at-

²⁰ J. W. Beede, "Geology of the Bloomington Quadrangle," in *39th Indiana Geological Survey Report* (Indianapolis, 1915), pp. 190-312.

²¹ Information on Bloomington's water supply problems has been assembled from official unpublished and newspaper reports partly by students who wrote papers under my supervision: Paul S. Visher, 1941; Eldon Jann, 1942; Don Rothrock, 1951; and Harry Taylor, 1955.

²² Richard L. Powers, "Wetlands and the Hoosier Stereotype" *Mississippi Valley Historical Review*, Vol. 22 (1935), pp. 34-48; R. L. Powers, "The Hoosier as an American Folk-type," *Indiana Magazine of History*, Vol. 38 (1942), pp. 107-122; S. S. Visher, Indiana's Geographic Regions," *Proceedings*, Indiana Academy of Science, Vol. 58 (1946), pp. 246-249; Don E. Bloodgood, "Early Health Conditions in Indiana," *ibid.*, Vol. 61 (1952), pp. 252-260.

tracted by the scenic beauty of the rolling landscape, with its exceptionally fine autumn and spring-time colors. The recreational attractiveness has been increased recently by the creation of several nearby artificial lakes and recreational areas, including two state parks and two state forest parks, and the construction of excellent state highways. Bloomington's residential attractiveness also has been increased by the apparent solution of the long troublesome water supply problem. The taking over by the R. C. A. of a huge building unused when the furniture industry collapsed (when Sears, Roebuck withdrew) has also contributed. At present Bloomington is reputed to have in that building the largest color TV factory in the world.

In brief, it is apparent that environmental factors fluctuate in significance. In Bloomington's beginning, locational factors were predominant; their significance, and that of soil, forest, and underlying rock have declined; topography has increased in importance; climate, favorable most of the year, has become notably less significant since drouths have been partly counteracted by the adequate water supply reservoir; air-conditioning has alleviated the hot spells and furnace heating the cold spells. The damage done by the frequent torrential rainfalls has been decreased by storm sewers and paving, and by the use of most sloping land for grass or trees rather than for tilled crops.

BOOK REVIEWS

CURRENT LITERATURE ON COMMUNIST CHINA

George B. Cressey. **LAND OF THE 500 MILLION.** New York: McGraw-Hill Book Company, 1955. xv and 387 pp. Maps, photos, tables, charts, bibliography, index. 7 x 10½ inches. \$10.00.

Theodore Shabad. **CHINA'S CHANGING MAP, A Political and Economic Geography of the Chinese People's Republic.** New York: Praeger, 1956. xv and 295 pp. Maps, tables, index. 6 x 9¼ inches. \$7.50.

W. W. Rostow and Associates. **THE PROSPECTS FOR COMMUNIST CHINA.** New York: John Wiley; Boston: Massachusetts Institute of Technology, Technology Press, 1954. xxi and 379 pp. End-paper map, tables, bibliography, index. 6 x 9¼ inches. \$5.00.

Yuan-li Wu. **AN ECONOMIC SURVEY OF COMMUNIST CHINA.** New York: Bookman Associates, 1955. x and 566 pp. Maps, diagrams, graphs, tables, bibliography, index. 6 x 9¼ inches. \$12.50.

Richard L. Walker. **CHINA UNDER COMMUNISM, The First Five Years.** New Haven: Yale University Press, 1955. xv and 403 pp. Illus., bibliography, index. 5½ x 8¾ inches. \$4.50.

S. B. Thomas. **GOVERNMENT AND ADMINISTRATION IN COMMUNIST CHINA.** New York: Institute of Pacific Relations, 1955. Revised Edition. v and 196 pp. Mimeographed. 8½ x 11 inches. \$2.75.

Geographers, among other scholars, have been faced with acute problems in attempting to deal with China in recent years. Added to the ever-present scarcity of analytical and descriptive data has been the transfer of China into the Communist World, which has both erected a Chinese "bamboo curtain" equivalent of the Russian Iron Curtain and imposed striking changes in the organization and operation of China's economy. Immediately after World War II, few sound current studies of China were available, though an occasional publication attempted on the bases of earlier data to provide an estimation of current affairs. These often had to interpolate data to a degree that rendered all data questionable. Gradually, scholars in various fields have tackled the problems of bringing together both factual and interpretive knowledge based upon Chinese Communist sources. Their results are being published in considerable numbers. Much of the material is systematic probing of particular themes, published in journals or in tentative, mimeographed summaries, but increasingly the efforts are resulting in a series of fairly definitive volumes.

These larger works now cover a series of subjects and together form a fairly adequate reservoir of material that enables the geographer to more effectively present a rounded story than has been the case to date. It is obvious that all authors have had both to sift much source material and to cope with the Chinese reluctance to openly and objectively publish the full story. All Chinese Communist publication is done with an eye to its domestic or foreign public relations value, which makes it propagandistic. However, those very needs often dictate the publication of material which can be utilized in the effective interpretation of almost any aspect of the Chinese scene. From considerable numbers of major studies recently published I have chosen for this review a group of six books that, between them, present an effective picture of the geographical scene and of the political, social, and economic changes that affect that scene. Two of the group are by American geographers, one is by a Chinese economist, and the other three are by American scholars working in political history and economy.

George Cressey's **THE LAND OF THE 500 MILLION** is in some respects the most pretentious of the six books in that it makes an effort to evaluate the total China and even to recommend to the Chinese things that they should do in the management of their country. I am tempted to label this study the conventional geography, but by this I mean only that it is a

volume constructed on an outline familiar to geographers. It certainly is the volume which geographers will find most familiar, easy, and rewarding to use if they wish to describe the landscapes of China in the manner normal to geographers. This is not just a revision of the 1934 volume, CHINA'S GEOGRAPHIC FOUNDATIONS; it is essentially a new book constructed on a similar framework. The first seven chapters, covering about 170 pages, deal systematically with people, area, climate, water, crops, minerals, and commerce and industry. Four chapters then discuss the above topics in the four major sections of China—the Yangtze Basin, South China, the Hwang Basin, and Manchuria. There are two short regional chapters, one on Formosa and one on the outer areas of China—Mongolia, Turkestan, and Tibet. A last chapter both assesses and recommends in the best non-partisan manner. An extensive bibliography ranges widely both in context and language, but, again, these titles are ones that the geographer expects to find in a geography text. Few of them are in the category of current reporting on change in China, and almost all of them are products of Occidental research. There are excellent photographs, good maps, useful tables, and a number of other helpful features in the volume.

Cressey's book is a general and regional geography of China that uses a good deal of historical and cultural perspective; it approaches the present and thinks for the future, but Cressey has resisted the pressure to make his book one of current reporting on Communist China. It will be criticized for this lack of data on current change. Yet, as a geographer, Cressey has kept his focus on the land and left to other social scientists the portraying of the changing ways of men. I personally wish that he could have devoted more chapters to the presentation of systematic elements of the cultural geography of the Chinese landscape, but my own recent experience in book publication, in which publication costs often dictate content, leads me to refrain from being caustic in this matter. It will be a long period before Cressey's volume will be improved upon.

The other book by a geographer does what Cressey did not try to do and is not to be described as a conventional geography book.

CHINA'S CHANGING MAP by Theodore Shabad sets for itself not the whole geography of China, but the currently changing China. On the whole it does a good job with its topic and forms the minimum complement needed to understand what is going on in China. As a New York *Times* foreign desk operative Shabad says he has taken his material from newspapers, periodicals, and Department of State External Research Staff reports and translations. He says simply in his bibliographical note that books and monographs were of little use to him because he sought up-to-date data. This book is much less a geography than is Cressey's, but for the scholar who wants to extend Cressey into the strictly contemporary it is a useful volume. After reading Cressey, many a geographer will quickly skim the opening chapter on the "Physical Setting," which is a restatement of several of the standard sources, whether listed in the bibliography or not. Shabad's primary contribution lies in the two chapters on the "Political Framework" and the "Economic Framework," covering about seventy pages. Here he has given the best concise statement I have seen of the changing political structure of the Chinese state around the ethnic elements that make up the total population reported by the 1953 census, and he has done an admirable job of setting down the essential facts of economic production trends. In most of his economic tables he states a pre-1949 peak, and then gives year-by-year figures through the planned goals for 1957. Checking various of these figures against those in other volumes under review the differences are no greater than one would expect from a region in which statistical tabulation is not yet a science and whose authorities make no effort to publish complete data.

The larger share of Shabad's volume is devoted to an interesting but somewhat curious kind of regional summary in which political units are discussed within a broad regional pattern. For example, within the discussion on the North China Plain one finds a section on Hopei Province. At the start there are useful facts about area, population, and boundary changes, and then one gets a running commentary on all manner of geographic phenomena, from cher-

nozem soils, iron-ore ranges, and electric furnace installations to the age of the city of Peking and the changes in the political limits of the city of Tientsin. Next one goes to Honan Province and repeats the process. There is a lot of very useful spot information given in these regional summaries, data of a sort never listed in Cressey's regional syntheses. I do not decry this compendium of regional information, for I will use it extensively myself, but it does remind one of the earlier days of geography when simply setting down facts region by region as one procured them was more important than synthesizing the intricate relationships of man and the environment or carefully formulating the philosophy for attacking a problem our students are being taught today. The maps in Shabad's book are sufficient for his purpose, which is a limited one of locating boundary lines and places. There are no photographs, and the bibliographic note is merely a statement of how he put the book together.

Third in importance to the geographer seeking an understanding of contemporary China is the Rostow volume. *THE PROSPECTS FOR COMMUNIST CHINA* was published in mid-1954, brings its tabular data only through 1952, and its procedural account into 1953, does less with event-of-the-moment than other volumes, but provides a most effective interpretation of how Communism came to the top in China and of how it operates. This book is not a one-man job, but is the product of a group project at the Center for International Studies at Massachusetts Institute of Technology. Most of the group had previous experience with a somewhat similar study of Soviet Russia, and the Center had made many smaller topical research studies on China. Here one should turn for interpretation of the bias, the background behind, and the reasoning for many of the propagandistic claims and assertions of the Chinese Communists. One chapter reviews the revolutionary period of China, 1840-1949, covering the breakup of the Manchu Empire and the ensuing struggle for power, and three chapters consider the maturing of Communist policy, 1940-54. A chapter is devoted to the historical ideology of Chinese society, and three chapters review Communist ideological reorganization. Then follow three chapters on Sino-Soviet relations from 1850 to date. Several chapters review Chinese traditional economy and the Communist reconstitution of that economy. A last chapter considers Communist goals in the future. Though a good deal of Russian and Chinese material had to be sifted to arrive at the conclusions given, the footnote references and the excellent classified bibliography are chiefly of materials in Western languages. Many statistical tabulations are included, there is only the end-paper political map, and there are no photographs.

The volume *AN ECONOMIC SURVEY OF COMMUNIST CHINA* is by one of Nationalist China's leading economists, Yuan-li Wu, working recently at Stanford University. He has written a tightly disciplined non-political study that in its 506 pages of text carefully assesses the economic development of China from the nineteen thirties through 1954. Though he has taken account of plans for the coming years, the rigorous control over his data often causes him to end his tables and graphs with 1952 or 1953. Here are to be found many of the data given by Shabad, though in less easily gleaned manner of presentation; Wu has critically analyzed developments in selected fields only. As an economist, Wu does more than present economic data scanned from newspaper and journal accounts, and his subjecting much of his material to the full analytical process of the economist yields significant conclusions. There is a good deal more here than the average geographer will need, but for those who want to go acutely into the economic workings of the Communist system Wu has provided an excellent survey.

An introduction and background take two chapters and some sixty pages, fiscal policy and money and banking get two chapters, labor and its organization, wages, and projects are treated in two more chapters, land and agriculture are considered in a pair of chapters, and industry and long-range development receive two chapters. Transportation and domestic trade are considered in one chapter and foreign economic relations in another. A short summary chapter completes the text. An excellent bibliography of both Chinese and English sources is provided covering Chinese economics. A good many graphs replace straight statistical tables. Several maps of communications facilities are serviceable presentations.

CHINA UNDER COMMUNISM, by Richard L. Walker of Yale University, published in 1955, is a political study of the methods by which the Communist Party runs China, and it is an important one for the geographer who would interpret the changing scene. Thirteen chapters examine different selected topics. After an opening summary on five years of Communist rule, Walker examines in succession how China is ruled: psychological control, the role of the mass drive, economic control, the peasantry, the urban workers, culture and the intellectual, and the use of terror in political administration. The final four chapters pertain to foreign relations, the Soviet Union, the United States, and a short concluding summary. Neither the bibliographic note nor the fifty pages of notes at the end of the volume constitute a proper bibliography, but a good many articles and books are cited. Much of the material has been drawn from the Chinese newspaper and periodical press. There are no maps, but there is a series of poster and comic book illustrations. This is not the doctoral dissertation by one who has never visited China that one English reviewer recently suggested it was. It is a political study, it does use unfavorable adjectives, it certainly does not reach favorable conclusions regarding Communist methods of controlling a society, and its author certainly has made no attempt at the kind of impartial discussion written by Wu in the economic field. But it is a clear presentation of how the Communist Party operates and of how Chinese society is being managed today under Communism. As such it helps greatly to explain the contradictions and the unexplainables that keep cropping up where China is concerned.

I venture to add one more publication to this list under review. It also is a political study, by S. B. Thomas, **GOVERNMENT AND ADMINISTRATION IN COMMUNIST CHINA**, the revised edition of which was completed in November, 1954. This is an effort to state factually how Communist society actually operates in terms of bureaucratic machinery. Making little effort to analyze complicated economic, political, or social phenomena, it devotes most of its pages to describing the working relationship of different elements of Communist political structure. After two introductory chapters it examines the constitutional structure of the People's Republic, describes the role of the army, the non-Communist parties, the Communist Party and its mass organizations, the network of local government, and the programs that each has been assigned. It then lists the developments of the years 1953 and 1954, and concludes by translating several speeches and editorials, and by giving the text of the 1954 constitution of the People's Republic of China. This study is a less formidable one than any of the others, but in its almost two hundred mimeographed pages appear a number of items in rather clear form that are not easily obtained from any of the other publications under review.

Looking back over this series of volumes, some general points appear. Cressey has written well of the land and of how Chinese society has lived in and used that land, but only here and there has he provided the interpretation that makes clear how Communists operate that land differently than did Nationalists or Manchus. Dealing with the issue of land itself, he presents a map of land usability for any kind of societal administration, a table of farm lands taken from a Nationalist source, and several pages of carefully worded statements in which there is a short, guarded commentary concerning patterns of ownership and issues of tenancy. He cites a few statistics to indicate that during the 1930's tenancy was not so viciously developed as many sources have suggested. He indicates the amount of redistribution and the beginnings of collectivization. In view, however, of the whole Communist appeal to the Chinese masses with a program which began with agrarian reform, his restrained commentary does not provide the detailed analysis required by the reader-at-large.

Shabad merely cites a Communist classification of ownership and tenancy which suggests that the farm people of China were completely at the mercy of vicious landlords and never subjects the generalization to any analysis whatsoever. Neither geographer performs satisfactorily here, though Cressey gives the essential facts and slips into no such naive trap as does Shabad. Here is a situation in which a geographer seeking knowledge on China had best turn to some scholar of another discipline, who has made it a point to study this basic problem.

Wu devotes a whole chapter to land, its redistribution, and the implication thereof, and

clearly demonstrates that Communist ideology made it necessary to distort the facts to the end that would make a popular appeal understood by the Chinese farmer masses who alone could turn the tide of governmental change. Walker also analyzes this basic feature of Communist policy, and Thomas devotes several pages to a step-by-step account of how the campaign of land redistribution was carried out. The separation of the farm populace into "landlords," "rich peasants," "middle peasants," "poor peasants," and "landless tenants," linked to such terms as "feudal" and "exploitative" was a propagandistic creation proportioned to inflame the mob reaction of the masses toward the overthrowing of the Nationalist control of China. There were farm operators who could be designated by these terms, and there have been such ever since private land ownership came into China prior to the start of the Christian era, but these never were fixed classes within Chinese society, a fact amply demonstrated by many agrarian studies in recent decades. It suited Chinese Communism here to use the successful Soviet technique of class revolution, though the Chinese scene did not well exemplify it. That it was but a tool of the moment is now indicated by the further step of collectivization that is taking place in China.

One of the features that appears in several of the studies is that the land redistribution program proceeded more rapidly than the Communist leadership had expected it would, that collectivization in the formal sense could begin sooner than had been scheduled, and that mechanization would also have to be speeded up more rapidly than had been planned.

All the volumes make clear that major steps are being taken toward industrialization as a national program, and that the program is moving faster with greater productive return than the professional skeptics had believed possible. Shabad's tabular presentation is the easiest to read in quick summary, with its map of industrial centers; Wu's two chapters provide the fullest economic analysis of how state planned and controlled industry can be brought about in a previously non-industrialized country; and Walker provides the clearest picture of how a government actually carries out the business of making the program work. Several of the sources make it quite clear that there is a concentration on producer goods, that the role of private business is a steadily lessening one, that handicraft manufacturing is expanding almost as rapidly as is industrial manufacturing; Shabad provides the simplest tabular demonstration of these trends, which demonstrates in sound economic terms and Wu agrees with in general, whereas Cressey provides the most geographically significant discussion. One item in relation to industrialization might be pointed out here: Cressey notes that at present Shanghai and its nearby hinterland leads in industrial output, but Wu makes the point that in new projects Manchuria and the northwest in general seem to be the regions of chief emphasis, that south China is receiving but little attention, and that Shanghai is being reduced from its former significant position. Wu suggests a northward shift of the economic center of China as an element in the overall economic relationship with Soviet Russia.

On the significance of the continuing relationship between China and the Soviet Union all the authors point out the close dependence of China upon the Soviet Union, varying only in the degree to which they think it will continue. Cressey is not sure whether the Soviet Union can and will deliver all that China may need. Each of the authors, except Cressey who seldom makes comparisons with the Soviet Union, makes it clear that Russia is the working model for the Chinese Communist program, but that variation in the development of the program will occur where situations to be faced differ from those of the Soviets. None of the others think that Russian failure to aid China financially or with materiel will separate the two states, and they lend small hope to those who sought in Mao a Tito who could be weaned away from Moscow.

In each of the volumes under review the first Five Year Plan of Communist China receives attention. Most of the authors make clear that the Communist leaders were not sufficiently in command of their society and its productive machinery, and were too little experienced in national planning, to be extremely efficient in their objectives for the first plan. But it is clear that there is increasing efficiency and confidence resulting from reworking the

first plan and from the results obtained so far. Already there are appearing proposals concerning second and third five-year plans which are expected to accomplish the basic reconstruction of China in the Communist mould. Such proposals naturally are necessary carrots to hold before the masses of China for some time to come, and there is evidence accumulating to the effect that New China's leaders are doing well enough to stay, whatever it costs in human lives and suffering on the part of those who have not the strength to oppose them.

Though I will not pretend that in working out this review I have digested every fact, opinion, or conclusion in every one of the six volumes presented, it does seem that, taken together, they form a significant group of sources. Though in places they overlap, they verify more than they contradict, and they complement each other to a very marked extent. No one alone will provide an adequate basis for a rounded discussion of China; together they provide material necessary for an understanding of contemporary China.

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